International clinics

INTERNATIONAL CLINICS:

A QUARTERLY OF CLINICAL LECTURES

ON

MEDICINE, NEUROLOGY, SURGERY, GENITO-URINARY SURGERY, GYNÆCOLOGY, OBSTETRICS, OPHTHALMOLOGY, LARYNGOLOGY, PHARYNGOLOGY, RHINOLOGY, OTOLOGY, AND DERMATOLOGY,

BY

PROFESSORS AND LECTURERS IN THE LEADING MEDICAL COLLEGES OF THE UNITED STATES, GERMANY, FRANCE, GREAT BRITAIN, AND CANADA.

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VOLUME I. FIFTH SERIES. 1895.

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Medicine.

ANTIPYRETIC TREATMENT IN ENTERIC FEVER; CASES OF RENAL DISEASE.

BY DAVID W. FINLAY, B.A., M.D., F.R.C.P.,

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ANTIPYRETIC TREATMENT IN ENTERIC FEVER.

· GENTLEMEN,—I propose this morning to bring before you in the first place some details of three cases of enteric fever, referring in particular to the effect produced on the pyrexia by antifebrin (acetanilide), and to discuss very briefly the advisability of antipyretic treatment in this disease.

CASE I. occurred in a lad, twenty years of age, named Alexander P., who was admitted in January last. He had been ill for about a fortnight with headache, sickness, vomiting, and abdominal pain, with occasional attacks of epistaxis. His bowels were at first confined, but had been loose for a week before admission. He complained of weakness and pain in the back, his face was flushed, tongue dry and tremulous, covered with brownish fur. The abdomen and lower part of the chest showed an abundant eruption of rose spots. He had some cough but no expectoration. Splenic dulness somewhat increased, but the organ was not palpable. The abdomen was not distended, but was tender on pressure, and the urine gave Ehrlich's reaction. At 7 P.M. on the evening of admission the temperature was 103.2° F. He was ordered five grains of antifebrin whenever the temperature was found to exceed 103°, and the particulars of the temperature and effect of the antifebrin are seen in Chart No. I. For the first few days after admission his bowels were loosely opened three or four times a day. The administration of the antifebrin was always followed by a

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notable fall of temperature within four hours, and by considerable perspiration. On one occasion it fell more than 7° in four hours. He was quite convalescent on the twenty-fifth day after admission, and made a good recovery.

CHART I.

Date		3			4			5			6	JANUARY	7			8			9		10
		P M		A M		P M		A M		P M		A M	P M		A M		P M		A M	P M	A M
Hour		2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6
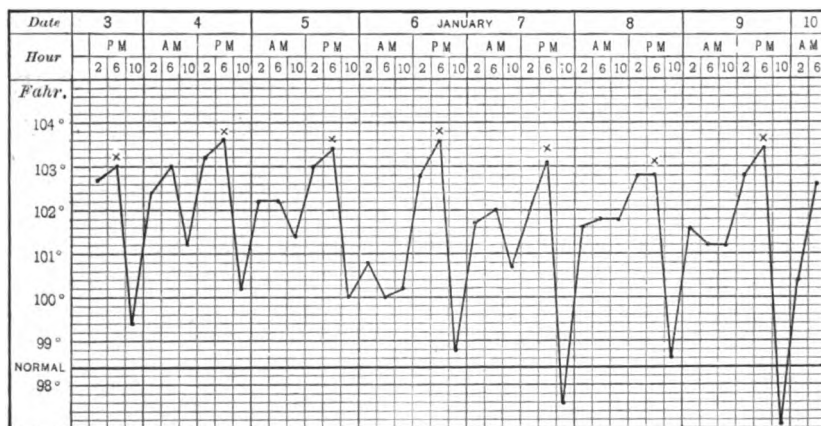
Temperature chart of Case I., illustrating the reduction of the fever following the administration of five grains of acetanilide, as indicated by the crosses in each day's record.

CASE II. is that of George H., by occupation a farm servant. His illness began on October 14 with headache and general malaise. A week later he took to bed, pains in the back being then complained of, as well as headache; also loss of appetite and constipation. To this condition abdominal pain succeeded, and he was admitted on October 26, complaining as above. On admission his face was flushed and he had a listless and apathetic appearance. His temperature in the evening reached 104.2° F., the pulse was 88, and the respirations 24. The tongue was coated with a thick white fur down the centre, but clean at the tip and edges. The abdomen was slightly tender, especially in the right iliac region, and distended, but presented no eruption. The urine gave a positive result with Ehrlich's test. He passed a rather restless night, but was not delirious. He had three grains of anti-febrin given to him whenever the temperature—taken at four-hour intervals—was found to reach or exceed 103°. The range of temperature and effect of the drug are seen in Chart No. II. On November 1 seven or eight rose spots were found on the lower part of the chest in front and on the abdomen, and on November 4 several appeared on the back. One or two fresh spots came out on the abdomen also after the first were noticed. The spleen was slightly enlarged, but was

never felt below the costal margin, and he had no diarrhœa at any time and very moderate abdominal distention. His last dose of anti-febrin was given on November 4, and, as his pulse showed no sign of failure, he was treated without alcohol throughout. He is now conva-lescent.

CHART II.
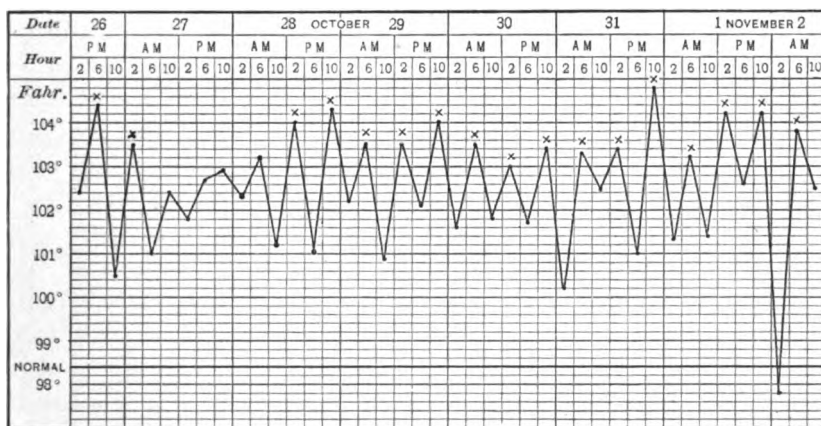
Reduction of temperature following three-grain doses of acetanilide when the fever reached 103° or more. Administration of drug marked by a cross.

CASE III. was that of a female, twenty-one years of age, present-ing well-marked features of enteric fever, except the eruption, which was at no time seen. Her temperature reached 104.8° F., when she had six grains of antifebrin, and in an hour her temperature had fallen to 100.5°. Her case did not differ much in its course from the others, except that she was occasionally delirious. Her abdomen was more distended and diarrhœa was a marked feature. She had tepid sponging as well as antifebrin, the latter being given when the former failed to bring down the temperature. The dose of antifebrin in her case was, generally speaking, six grains, and upon one occasion this reduced the temperature from 104.6° to below normal, the reduction being accompanied by profuse sweating and some collapse, for which two ounces of brandy were given. She was the only case of the three in which symptoms of collapse appeared after the administration of the drug, although what might be called collapse temperatures were re-corded once in each of the others. She had a small quantity of brandy daily from the date of admission for nearly a month, the amount varying, according to circumstances, from two to six ounces. She also made a satisfactory recovery.

The effect produced in these cases (and the number might be multiplied) leaves no room for doubt that in acetanilide we have a powerful antipyretic agent, and one on which we can rely in the great majority of cases to bring about speedily a considerable reduction in febrile temperatures. But it may be asked, What good is gained by reducing the temperature in enteric fever? as the course of the disease does not appear to be shortened by this method of treatment. The advantage suggested is based on the recognition of the fact that in the high temperature, if continued for any length of time, we have an element of danger from the effect which it produces in excessive tissue-change and the degeneration of muscular fibre,—especially of the heart,—leading to heart-failure and its consequent fatal hypostatic congestion of the lungs. The same considerations appear to me to be applicable here as in the analogous case of treatment by the external application of cold in this fever, which has been largely practised both in England and on the Continent. It was first systematically used, I believe, by Currie, about one hundred years ago, and was revived by Brand, of Stettin, about the year 1861. The view of the latter was that, in controlling the pyrexia from the first, the disease process in the intestinal glands is checked and does not go on to ulceration at all, as a result of which diarrhœa does not occur, and hemorrhage and perforation are unknown. And if at the same time the muscular degeneration above alluded to does not take place, so that there shall be no pulmonary congestion, and in the same way the nervous system escapes the degenerative change which pyrexia produces, enteric fever might come to be a comparatively mild and manageable disease.

As Liebermeister puts it,—

" By far the greater number of those who succumb to typhoid fever die from the effect, directly or indirectly, of the fever-heat. In the hospital at Basel, among two hundred and ten fatal cases that occurred during the years 1865 to 1868, there were eighty-six in which death resulted from paralysis of the heart, without any special complication (except œdema of the lungs dependent on the paralysis) or paralysis of the brain (without any of the coarser anatomical changes being found in the encephalon). It appears, then, that forty-one per cent. of the deaths are due to the direct influence of an elevated temperature. And in the remainder this same influence has a share in producing the complications or in bringing about the fatal result. If we could guard our patients against the deleterious influences of excessive animal heat, typhoid fever would no more be included among the specially dangerous diseases."

Some of Brand's statistics are very suggestive. In his own practice he records three hundred and eighty-one hospital cases, with a mortality of fifteen, or 3.9 per cent., and two hundred and fifty-seven private cases, all of whom recovered. His conclusions regarding the effect of refrigeration on the fever process in the intestinal glands seem to gain some countenance from the course of the disease in Case II., which I have referred to, assuming that the effect of reducing temperature by drugs would be substantially the same as reducing it by the external application of cold; for in it abdominal symptoms have been almost absent; in particular there has been no diarrhœa at any time. As to drawbacks to the employment of acetanilide, I know of none except the danger of inducing a condition of collapse, and this would be a serious matter if it were inevitable. But it is not so. If it should occur, it may be soon overcome by stimulants and warm applications; and it is not likely to occur at all if too large doses are not given: about three grains of the drug appear to be sufficient to control the temperature in a marked degree in an adult, and two grains would be enough in the case of a child, perhaps less. My recent experience has been limited to the use of antifebrin. I have never tried phenacetin, but I gave antipyrin a fair trial, and have discarded it as unsatisfactory. Its disadvantages as compared with antifebrin are its liability to cause nausea and sickness. The dose requires to be large; it is more depressant; its effects are more transient; and it produces sometimes a profuse erythematous rash. These points were well exemplified in a severe but uncomplicated case of enteric fever which was admitted under my care into the Middlesex Hospital a few years ago during the second week of the illness. Antipyrin, in twenty-grain doses, was administered over a period of sixteen days, seventy-one doses in all having been taken. It requires four or five doses on the average, and from three to ten hours in time, to bring down the temperature from between 103° and 105° to 99° or 100° F.; sickness was frequent, occurring thirteen times; the rash above referred to became developed on the ninth day of treatment, and complete apyrexia was not reached until the twenty-eighth day.

The course which I now adopt is to have the temperature taken every three or four hours, and order a three-grain dose of antifebrin when it is found to be 103° F. or over. I have not had a sufficient number of cases to enable me to adduce statistics of much value, but I may say at least that all the cases have made good recoveries, and none have seemed to have been more than slightly and very temporarily unfavorably affected by the drug. Antipyretic treatment by

the application of cold externally appears at present to have lost favor, except in special cases, in this country ; and we may, I think, attribute this fact largely to the use of antipyretic drugs, on account of their superior convenience. It is also probably on this account that they are made use of earlier than would be the case with the bath or cold pack, and so may prevent the temperature from rising to hyperpyrexial height, requiring more energetic or heroic treatment.

CASES OF RENAL DISEASE.

My second set of cases illustrates difficulties of diagnosis. I show you here the left kidney (see plate), which was furnished by a female patient, forty-eight years of age, admitted on November 26, who died on December 2. What history and symptoms, it may be asked, should we have expected in such a case? Well, probably at least pain of a dull, aching kind in the left lumbar region, with perhaps occasional attacks of a sharper pain after exercise, tenderness on pressure; hæmaturia at some time or other, frequency of micturition, pus in the urine, albumen, also, and perhaps a few casts. I may state at once that none of these conditions, with one doubtful exception, were present. The following is a short history of the principal points of the case. The patient was sent to us with a diagnosis of enteric fever, and those of you who went round the ward with me when her case was first investigated may remember that we examined into her history and symptoms with that disease in view, but with the result that we could find nothing justifying such a conclusion. The whole surround-ings of the case, indeed, were so anomalous that we had to leave it undiagnosed altogether.

The patient stated that her illness began about a month before ad-mission, up to which time her health had always been very good, with the exception that she was troubled with habitual constipation. When the present illness began she had attacks of shivering, notwithstanding which she continued at her work (that of a fisherwoman) until about ten days ago, when she took to bed. At first she had headache and some abdominal pain, and she once vomited some greenish fluid. During this illness she has had frequent attacks of shivering, and she thinks that her bowels have acted only once during the last two or three weeks.

On admission she was noted to be a dark-complexioned woman, rather sallow, with sunken eyes, considerably emaciated, and having an apathetic expression. She complained of no pain. Her tempera-ture was 101° F., pulse 132, respiration 32. During the evening the

temperature rose to 104.6° F., but fell rapidly again to 99° F., and, although she complained of shivering before the rise of temperature, no rigor was observed. There was nothing noteworthy in either respiratory or circulatory systems as regards physical signs. The tongue was dry and glazed and slightly fissured ; the liver and splenic dulness were normal. There was no abdominal tenderness, and no distention or eruption observable. The urine was pale, slightly turbid, acid, having a specific gravity of 1013, and was free from sugar. It gave no reaction for albumen with cold nitric acid, and only a faint suggestion of it with boiling and salicyl-sulphonic acid. There was a very slight deposit in the urine glass, and under the microscope no pus-cells were to be seen and no blood-corpuscles. Two days after admission (November 28) the patient complained of shivering, but there was no appearance of rigor, the temperature was rather unsteady, rising to 103.4°, and falling shortly to 101.2°, pulse and respirations remaining much as before. On this day the bowels acted once, the motion presenting a natural appearance. The tongue was dry and glazed, and a little coughing was noted, with scanty expectoration. The sputum was examined for tubercle bacilli, but none were found. On December 1 she was noticed to be getting gradually weaker, but she still complained of no pain ; the pulse was failing, and the slight cough still continued. At the anterior apex of the right lung the breath-sounds were thought to be harsh ; and, with inspiration, a sound resembling friction was heard, and at the extreme base the resonance was slightly impaired, and a few crackles were audible.

On the following morning she complained of severe pain in the region of the rectum. Digital examination, however, revealed nothing to account for it. After this she became collapsed and died in the afternoon. At the post-mortem examination, in addition to the presence in the left kidney of a large calculus, the substance of the kidney was found to be much atrophied, and the pelvis and calyces were distended with semipurulent fluid. The other kidney was enlarged and mottled on the surface with yellowish spots, and on section the organ appeared to be the seat of a septic nephritis. There was nothing otherwise important in the post-mortem except that the right pleura was obliterated by old adhesions, and the base of the lung was œdematous. The only reading of the case during life which seemed to me to bring it into possible connection with enteric fever was that the ailment dated further back than appeared from the history, and that secondary implication of the mesenteric glands might have started the septic condition, which was evidenced by the irregular type of temper-

ature and the rigors. But such a view would have been a far-fetched one. There was certainly nothing in the case during life fitted to suggest the presence of a stone in the kidney; and if there had been, nothing in the way of treatment could have been devised for it, under the circumstances, with any reasonable hope of success. The wonder is that so large a calculus could have occupied the position it did, and probably for a long time, without giving rise to any symptoms raising a suspicion of its presence. And as regards the absence of abnormal urinary conditions, this may be, partly at least, accounted for on the supposition that the lower part of the calculus acted as a plug in the commencement of the ureter, preventing any fluid from the left kidney reaching the bladder. This condition, however, may have been an intermittent one, and it is likely that at some period pus might have been found in the urine.

My next case is one which raises the question of surgical procedure with a view to absolute diagnosis where a doubt may be thought to exist.

The patient was a boy, aged eleven, who was transferred from one of the surgical wards, and came under our care on September 7. There was no history of tubercle in his family, and the boy himself had enjoyed good health up to the time of the present illness.

About the end of last year he noticed that he required to pass water very frequently, having to rise seven or eight times in the course of the night on many occasions. The urine was observed to deposit a white sediment (probably pus) and occasionally also small blood-clots. Micturition was at first painless, but about the month of May he began to experience pain at the point of the penis while making water. Since admission his urine has always contained more or less pus, and for a period of a week in July it also contained a considerable quantity of blood.

While in the surgical ward a very complete examination of his urinary organs was made by my colleague, Professor Ogston, under chloroform, with negative results, no evidence of stone being found in the bladder or of tumor or tubercular disease anywhere. He had no cough, but was occasionally troubled with sweating at night. On being transferred to the medical ward he was found to be a fairly well-nourished boy, with pallid complexion and languid manner, free from pain on micturition, but complaining of weakness and of some pain in the left lumbar region on movement. Nothing abnormal was found in the condition of the circulatory and respiratory systems, or in the digestive system, excepting some coating of the tongue and irregularity in the action of the bowels.

As regards the urinary system, the urine was pale in color, turbid, acid, having a specific gravity of 1017, containing a considerable quantity of albumin and a large deposit of pus. One or two crystals of uric acid were seen, and subsequently a few oxalates, but no tubercle bacilli were found in the pus after repeated examination, and no tube-casts. The quantity of pus in the urine varied considerably from day to day, from one-tenth to one-fifteenth, roughly estimated; the smaller quantities being found, as a rule, in connection with the later observations.

The estimation of urea showed the following results, extending over a period of a week:

Dates.—September 14.	15.	16.	17.	18.	19.	20.
Quantity of urine in ounces . . 86	40	44	48	44	86	40
Urea in grains 250	240	237	260	211	150	192

In regard to weight, he lost a few pounds at first, but afterwards regained nearly the whole of this loss. His temperature showed something of the hectic type, but was never high.

Towards the end of October the left kidney was felt to be enlarged and was somewhat tender on pressure. The treatment during two months in our ward resulted in some general improvement in his condition, but it did not amount to much, and he was returned to the surgical side on November 3.

As to diagnosis, there is no doubt that tuberculosis of the kidney was more strongly suggested than anything else by all the facts of the case; but two cases which have been under my care in the past led me to think that an exploratory operation in this was not only justifiable but to be recommended. One of the cases referred to was a young female with a considerable swelling in the situation of the right kidney and pus in the urine, which had lasted for a considerable time, but with nothing in the history or otherwise suggestive of renal calculus. Her case was judged, after a consultation in which several distinguished physicians and surgeons took part, to be one of renal tuberculosis, and therefore not calling for operative interference. It must be added that, as in the boy whose case we have been considering, there was no evidence of tubercle in the body elsewhere.

As the swelling increased, causing considerable pain, and the patient herself was anxious that something should be done, I decided that the kidney should be incised and the pus allowed to drain through the loin. When this was done the first gush of pus brought with it a calculus of moderate size; and a much larger one was

removed in the subsequent course of the operation, the result being that the patient's discomforts were immediately relieved and she made a fair recovery.

The other case occurred in a woman of middle age, who had fallen and struck the upper part of her left loin against a stair. Before this she had been quite well. Pain over the seat of injury continued, and was accompanied by frequency of micturition. After some time she complained of shivering and sweating, and the urine was found to contain pus. In the left loin a swelling was readily detectable, perinephric abscess was diagnosed, probably resulting from the injury, and opening into some part of the urinary tract; and she was handed over to the attending surgeon for operation. Subsequently a large quantity of pus was evacuated, through a lumbar incision, and a large branching calculus was found at the bottom of the abscess cavity and removed.

The calculus in this case had, no doubt, long remained in position in the kidney undisturbed; but the violence of the fall had caused some laceration or absolute rupture of a portion of the kidney, and the setting up of perinephric abscess and the passage of the pus through the opening of the kidney into the urinary passages were the natural result.

To summarize, it will be noticed that in none of the cases of renal calculus which I have brought under your notice was the diagnosis of calculus entertained; it remained to be demonstrated by the postmortem examination in the one case, and by operation in the two others. Surely, then, in a case where doubt is possible, it is only right to give the patient the benefit of the doubt, and I would venture to lay down for your guidance the rule (to which there should be few exceptions) that where the *probable* diagnosis is tubercular disease of the kidney, an exploratory operation should be advised, unless evidences of a tubercular process are found in connection with some other organ, or tubercle bacilli are found in the pus passed with the urine.

It only remains to be added that in the case of the boy which we have been considering, the consent of the parents to an exploration was withheld.

THE AMOUNT OF MATERIAL WASTED AND FOOD REQUIRED IN DISEASE.

BY PROFESSOR CARL VON NOORDEN,

Physician-in-Chief to the City Hospital, Frankfort-on-the-Main.

GENTLEMEN,—It is a matter of fundamental importance, in entering upon a study of the science of nutrition and its application in practice by the sick-bed, that we should know how great is the waste of material in disease and what amount of food is required to make good this loss. Investigation, after having followed many a wrong cue, has finally led to the sure knowledge that all relations between the amounts of material wasted and of food introduced into the body are controlled solely by the former, and that the amount of food introduced is adjusted and regulated accordingly, else the equilibrium of nutrition would be disturbed. Never does the reverse take place, that the supply of food received by the body controls its waste. This is one of the fundamental rules of biology to which there is no exception even in disease. To the simple understanding of former times the waste during disease seemed small. Men judged by the usual loss of appetite, regarding it as a clever shift of nature, whereby the supply of nourishment was adapted to limited requirements. We now know that in disease the appetite is fallacious; that a patient's appetite, unlike that of a healthy person, is apt to be misleading, and that it affords no clue as to the amount of material wasted and the quantity of food thereby necessitated; at such a time it is a dangerous guide to trust.

We must look to other criteria if we desire to form an estimate of a patient's waste of material, so as to be able to determine how much food he requires. These are furnished us partly by certain data of biology, from which they may be deduced with a certainty almost mathematical, and in part by experience gained by the bedside.

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I.

The external conditions of a patient's life in many cases undoubtedly lead to less wasting than in health. When his ordinary occupation is given up; when his muscles do less work, or are entirely inactive for the most part, owing to confinement in bed; when loss of body heat is restricted through sojourn in a room of even temperature or in bed; when in the quiet sick-room, owing to the lack of wonted stimuli, reflex irritation is diminished,—then the amount of decomposition within the body becomes likewise lessened. We are not far from the truth in estimating the daily *Stoffumsatz* (metabolism, development of calories, amount of oxidation) of a person moving about freely and performing light work at about fifteen to twenty per cent. higher than what it would have been had the same individual been shut up in-doors or kept in bed.

When a person used to hard bodily labor is confined to his room or his bed by a sudden attack of disease, the difference between the amounts of waste during the periods of work and of rest is even more marked: it is apt to go as far as forty or sixty per cent., or even higher.

The amount of decomposition in the case of the average human being may be regarded as equivalent to about thirty-eight calories for each kilogramme of body substance (sixteen and one-third calories per English pound); during bodily rest, such as is necessitated by disease, the amount would accordingly correspond to only thirty-two calories, more or less, per day and kilogramme. In this sense, therefore, the old doctrine of diminution of waste in disease is right.

However, of those patients to whom we must prescribe a diet of a certain kind and quantity, only a fraction is confined to the room or bed. Many follow their daily pursuits, take out-of-door exercise, and undergo a varying amount of muscular fatigue. Whether such persons be suffering from some disease of the stomach, or from an intestinal or a liver complaint, or whether they be affected with diabetes, gout, or heart-disease, the circumstances do not afford any reason why their bodily waste should be less than in the case of healthy persons.

Supposing the disease did not produce certain changes in the amount of material used, we might apply our figures (mentioned above) to the amount of food required, and then formulate the following statements:

In order to preserve the material equilibrium of the body,—

A patient moving about freely and following his ordinary pursuits

requires the same amount of food as a healthy person occupied in the same way,—that is to say, so much food as to represent the physiological energy of about thirty-eight calories for each kilogramme of his weight, and for each day.

A patient resting in bed or confined to his room requires about four-fifths to five-sixths of the above amount, corresponding to about thirty-two calories.[1]

II.

Thus far we have been led by the consideration of external influences during disease. We must not, however, lose sight of the question whether the *disease by itself* produces certain quantitative changes in metabolism, thereby influencing the body's requirements in the way of food.

Thus much is to be said on this head,—

1. Formerly the opinion was current, resting on theoretical considerations, that many diseases diminished the amount of oxidation; the immediate result would be a diminution also of the quantity of food required. This opinion was held chiefly in regard to chlorosis, severe anæmia, diabetes, gout, carcinoma, and grave affections of the organs of respiration and circulation. Accurate investigations have proved this doctrine to be wrong. Metabolism in these diseases goes on either at the normal rate or else it is increased.

2. It seemed for a time as though in every disease, under certain circumstances, the amount of material waste was extremely diminished, —namely, after the patient had passed through a protracted period of defective nutrition.

Klemperer thought that in such an advanced stage of disease as marasmus, metabolism was so greatly diminished that no more than fifteen to eighteen calories corresponded to one kilogramme of body substance. This would evidently point to the conclusion that our

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[1] As to the computation of the caloric energy of food and its value, consult, among others, Von Noorden, "Metabolism in Diseases of the Stomach and its Therapeutic Requirements," *Berliner Klinik*, No. 55, 1893; also Von Noorden, "Lehrbuch der Pathologie des Stoffwechsels" ("Text-Book of the Pathology of Metabolism"), Berlin, 1893. These, as well as many other publications on metabolism and nutrition, tell how to calculate the physiological or caloric energy of food, and bring a number of examples of such calculation. Similar tables have of late been inserted in some special works on diseases of the stomach, on obesity, on diabetes, and so forth. However, all these works do not quite answer their purpose. What we require is a cookery-book for patients, not only describing how the food is to be prepared, but also stating what is the nutritive value of the different dishes.

patients require but extremely little nourishment so as to preserve and even add to their standard of weight. This doctrine has been received with unusual favor by practitioners generally; as an instance I may mention an experience I have frequently had in cases which I was called to see in consultation. When I insisted on the necessity of copious nourishment for emaciated patients, I was met with the objection, on the authority of Klemperer, that a sick man did not require so much food. I therefore wish to reiterate that Klemperer's calculations are based on unsound premises, and that it is by no means proven that in emaciated individuals metabolism has sunk to so low a level.

3. Some diseases contain elements by which metabolism is increased beyond what it would be in healthy persons under the same external influences: fever-temperatures, accelerated and labored respiration, excited action of the heart, restless tossing in bed, muscular tremor, cramps,—all this draws more heavily on potential energy, and produces more waste of oxidizable material, and requires an increased supply of nutriment, so as to keep up the material balance of the body.

4. In many diseases the nutrient ingredients of the food are imperfectly extracted in the intestine, either of every kind of food or of individual substances, such as fat or albuminates, and so on (diseases of the intestine, the liver, the heart, acute feverish infectious diseases, etc.). Now, as man lives not by what he eats, but by what he digests and absorbs, in these diseases, owing to a greater amount of material being passed off in an unabsorbed state, there is more food required rather than less in order to make up for the body's waste. Diseases wherein absorption of food in the intestine is more active than in the normal state are not known.

5. In many diseases, not even the whole amount of what is actually absorbed is utilized by the body, since part of the oxidizable material leaves the body either not at all or but partially oxidized, as in diabetes mellitus: part of the carbohydrates of the food is passed off unused with the urine; or, as in albuminuria, in the case of wounds with much secretion, or of copious expectoration, an amount of valuable material is lost; or in bad (violent) acetonuria, in diaceturia, and when greater quantities of lactic or oxybutyric acid, or other substances, are passed, these substances still possess a large measure of potential energy which would have been of use to the body if they had been burnt up into CO_2 and H_2O. I might mention more such examples. In all these cases, the body, in order to preserve its material balance, requires more food than during health.

III.

The most convincing insight into the amount of metabolism going on in the body and into the amount of food thereby necessitated, is furnished, of course, by practical experience gained by the bedside. Sure and important results may be achieved in this way by the help of certain fundamental rules of the doctrine of nutrition.   The rule I have in mind is this, that whenever more food is introduced into the body than meets the requirements of waste, the body is thereby a gainer in material substance; its weight is increased.   The scales are thus made to judge whether our dietary prescriptions suffice to make up for tissue-waste or not.

We must, of course, not allow our judgment to be influenced by a small increase or loss of weight, which is often apt to be followed by the reverse.   If our results are to turn out reliable, we must avoid naturally taking into consideration patients with œdema; for here fluctuations of weight are dependent on matters that have nothing to do with the diet.   This is generally appreciated, and I need not enter on the subject.   When, however, the patients are beset with œdema, then their bodily weight serves as an admirable means for measuring the adequacy or inadequacy of nutrition.

Enduring constancy of weight, extending through a course of weeks, proves that the quantity of food introduced corresponded exactly to the needs of metabolism.

Enduring *increase of weight,* extending through a couple of weeks, *proves that more food was introduced than required by metabolism;* in this case material is saved up and garnered.   Whether this be albuminous matter or non-nitrogenous does not concern us at present; nor is this the place to discuss in what particular cases such an accumulation of substance may or may not be desirable.

Enduring *decrease of weight,* extending through a couple of weeks, *proves that less food was introduced than required by metabolism;* some of the body's own substance had to be added to the material digested and absorbed, in order to provide what was needed.   This is made use of occasionally for therapeutic purposes, as, for instance, in the treatment of corpulence.

These are inviolable laws of biology, true in health as well as in disease.

I have by their help made investigations calculated to give us information regarding the actual amount of waste and of food required in disease.   These investigations are not yet terminated; I am still

engaged in carrying them on, and hope soon to be able to publish full data.

The method used by us is the following, in numerous cases of various diseases, some of which were in a good, others in a moderately fair, and still others in a bad state of nutrition.

a. I have carefully kept accounts of the amounts of food daily consumed, and I have calculated the caloric value of this food, the composition of which had been ascertained by numerous analyses.[1]

b. I have noted down the weight of my patients.

I have never—except in the case of obese individuals—*seen a lasting increase in weight extending through the course of weeks unless the caloric value of the food amounted to,* in the case of bedridden patients, twenty-six calories per day and kilogramme; in patients out of bed, but confined to the room, twenty-eight calories; in patients who took out-door exercise and lent a helping hand to the nurses in the wards, thirty-two calories.

These are the *lowest values.* They were not found in more than a small percentage of cases. *As a rule, a much greater amount of nourishment was required to increase the bodily weight.* In more than half of the cases in bed this value went beyond thirty-five calories a kilogramme. I can affirm, in opposition to Klemperer, that the most emaciated patients were the very ones who failed to show a permanent increase of weight until their amount of food was raised very high indeed.

I consider these researches valuable, as they afford us minimum values in regard to metabolism. The greater part of my observations have been taken from patients confined to their beds. For such cases I believe myself justified in establishing an *average* standard of minimum value. I find that *patients in bed on the average begin to gain weight when the caloric value of their daily food comes up to thirty-two and a half calories a kilogramme.*

The values that I have given on a former page show that I have witnessed progressive increase of weight in some cases where the caloric value of the food was much smaller (twenty-six calories per day and kilogramme), remaining about twenty per cent. beneath the average. Similar observations had been previously recorded by C. von Voit, Fr. Müller, and others. On closer investigation, these cases mentioned in the literature of the subject prove to be owing to peculiar

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[1] 1 gramme of albumen = 4.1 calories; 1 gramme of fat = 9.8 calories; 1 gramme of carbohydrates = 4.1 calories; 1 gramme of alcohol = 7 calories.

circumstances. It is not permissible to infer from them that metabolism and the requisite amount of nourishment can really sink to so low an ebb. For it turns out that in every one of these cases, owing either to ulceration or stenosis of the œsophagus, or to grave diseases of the stomach, or for other similar reasons, the patients in question were restricted not only as to the ingestion of oxidizable food, but also as to the consumption and absorption of the necessary amount of water. A relative desiccation of the tissues had taken place. The increase of weight that took place on the re-establishment of circumstances favoring absorption was greatly owing, doubtless, to the replenishment of tissue-water; at any rate, there were powerful objections against attributing it to hypernutrition. This class of "dry" patients, when afforded a copious measure of fluid food, frequently gain in weight, while losing at the same time tissue-albumen and fat. This increase of weight is as deceptive as in the case of patients with progressive œdema. My experience has been this, that whenever a striking increase in weight took place in spite of the value of oxidizable food-material falling short of thirty calories, the body had previously been suffering from loss of water. There would be a short and sometimes abrupt rise in bodily weight till the tissues were saturated with moisture; after that the amount of food had to be augmented considerably in order to maintain or increase this gain in weight. I feel bound, therefore, to warn against the idea that when an emaciated patient grows heavier this increase is necessarily a proof of material gain on his part, indicating him to be sufficiently nourished, or even overfed.

In general, we had better estimate the necessary quantity of food (for the maintenance of metabolism) at thirty calories per day and kilogramme for all patients. Lower values are required only in cases of adiposity; but I do not mean to here enter on that subject, having recently discussed it in detail (*Berl. Klin. Wochenschrift*, No. 24, 1894).

In many cases the proper number of calories is apt to be a good deal higher than thirty. This is owing in part to causes that have been explained in the preceding pages, whereby the patient's metabolism is increased. Besides, we should consider that the relation between the bodily weight and the amount of calories, even in a number of healthy persons, all engaged in the same kind of work, does not represent the same immutable fraction.

Psychophysics teach us that between irritation and reflex action a new personal factor slips in, reinforcing or weakening the reflex impulse, as the case may be, and determining our personal equation. In like man-

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ner the oxidizing protoplasma of different individuals answers to internal and external irritation with much, but not quite the same, energy.

A minimum measure of energy, however, obtains in all human beings, whether they be in good or in bad health. It is important to have a just conception of this measure, as it affords us an indispensable guide for the choice of a therapeutic regimen.

The entire history of our modern science of nutrition goes to show that dietary prescriptions should no longer be confined to laying stress on the *quality* of food that may or may not be taken. I think that in many respects we have gone too far in our tendency to discriminate between permissible and non-permissible food. In this respect I may call attention to the total prohibition, absolutely unjustified, of the use of butter in diseases of the stomach; or I may point to the numerous errors that have turned up during the debates on the treatment of corpulence. The one-sided way in which attention was focussed on the quality in diet has led to ridiculous petty distinctions in certain branches of the subject. In point of fact, the choice of food in disease has a much more extensive area than our text-books would lead us to believe. In my opinion, dietetic science has finished the greater part of its work, as far as the discrimination of the quality in food is concerned.

It is necessary, on the other hand, that more attention than heretofore be paid to the subject of *quantity*. The relations between income and expenditure, between food and work, between the nourishment introduced and the maintenance, the increase, and the decrease of bodily substance, are all of quantitative nature. It is highly important to keep track of these figures, so as to be able at a moment's notice to deduce the equation between the amount of material consumed and of food required; one ought to be able to do this for every patient, bearing in mind the particulars of each individual case. In other words, all measures of diet are based on the question as to *how much* a patient requires, and *how much* he is to eat. The further question as to *what* he is to eat is also occasionally of great importance, as in diseases of the stomach or the intestine, or in diabetes; but in the great majority of cases, in acute and chronic fevers, for instance, this is rather a matter of terms, although it must not be neglected either. The subject of quantity, however, is forced upon us as an imperative necessity intimately connected with the iron law of the preservation of energy. It would be acting against the interests of science if we lost sight of this fact, and if we did not strive to impart the knowledge of the actual nutritive value of food as common property to medical men in a wider sense than has hitherto been the case.

COMPLICATED RHEUMATISM.

CLINICAL LECTURE DELIVERED AT THE LONDON HOSPITAL.

BY ARTHUR ERNEST SANSOM, M.D., F.R.C.P.,

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Hospital Medical College.

GENTLEMEN,—To assert that rheumatism is not a painful disease may sound somewhat startling, as the direct negative of this would seem to be the prevailing opinion of the world at large. Our patients call almost every affection attended with pain rheumatic. In times past the term rheumatism was applied to diseases in which there was a mucous flux, to catarrh and bronchitis, as well as to affections of the joints. Then all diseases caused, or supposed to be caused, by chill were called rheumatic. Lately, however, people are inclined to accept the one definition for rheumatism as *something painful.* Whether the joints suffer, or the bones, or the muscles, the painful ailment is put down in the public mind as rheumatism or rheumatics. It behooves us, as physicians, to clear our own minds of any such delusions, and to definitely picture to ourselves what group of diseases we ought to term rheumatic. Whatever the nomenclature in times past, we ought now to apply names to diseases in obedience to some system, grouping and classifying cases of disease according to their clinical signs and symptoms and to the pathological changes observed therewith,—that is, according to their obvious associations and affinities, as scientifically determined. The method by which we should do this was best described by Morgagni. I may paraphrase his Latin sentences thus, " There is no other way of obtaining a precise knowledge of disease than that of obtaining as large a number as possible of observations of cases and of their morbid anatomy, comparing these with each other and with the records of the past." Thus we learn the only lessons that can be of value. We have had abundant opportunities here of studying rheumatism in the adult and in the child. We have traced the outlines of the disease. With regard to painful affections of the

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joints we have found that these are limited in time,—say seven to fourteen days in the average attack of acute rheumatism,—and recurring only with subsequent exacerbations of the disease. They are also limited in intensity, for in rheumatism there is an effusion only into the serous membranes, without notable inflammation of the surrounding structures. Other manifestations of rheumatism, especially those affecting the endocardium and pericardium, are of far higher importance than the joint-symptoms, and these are long drawn out, so that the disease, rheumatism, long outlives the joint-affection. Painful conditions of the joints are only a very small part of rheumatism. On the other hand, extremely painful inflammations of the joints with destruction of the tissues occur in diseases which are not rheumatic. We have seen these in pyæmia, in syphilis, in scurvy, and in many infectious diseases, such as scarlatina, typhoid fever, and mumps. We have observed them especially in some cases of influenza, closely resembling rheumatic fever in the earlier period, and in the minority manifested in an intense form in the later periods. We have found them also to occur in acute diseases of the spinal cord, cerebro-spinal meningitis, and again we have found them also in an intense form in a disease known as osteo-arthritis (arthritis deformans), entirely apart from rheumatism and without any notable morbid antecedent. (INTERNATIONAL CLINICS, 1893, vol. i. p. 58.) Therefore, we have before us two propositions. The first is that the pain in the joints in true uncomplicated rheumatism is limited both in duration and intensity. The second is that the pain in the joint or in joints, in affections other than rheumatic, may be very protracted, and the morbid changes of an intensity far greater than that in rheumatism. But occasionally we find cases in which we should be justified in a diagnosis of rheumatism, wherein the painful affections of the joints and the structural changes therein are long continued and intense in a manner quite disproportionate to that we usually find in rheumatism. These are cases of what I have called *complicated rheumatism*. Observe that I do not call pericarditis or endocarditis and the various skin eruptions that we sometimes observe complications of rheumatism. These are part and parcel of the rheumatic process, but these pains in the joints, intense and protracted, accompanied by thickenings and enlargements, I have termed complicated rheumatism, and on this point we will get evidence derived from clinical observation.

CASE I.—A woman, aged twenty-seven, was lately admitted under my care, complaining of pains in the joints, headache, and sweating. Her temperature was 99.8° F. There was probably a family proclivity to rheumatism. Her father died from meningitis and her mother and

sister suffered from heart disease. The patient said she had had a sore throat frequently, but no rheumatic fever. The illness for which she was admitted began a week previously, and she had pains in the right arm, left leg and knee, right knee, and the left hand and fingers. She was pale and anæmic; the tongue presented a white, furred appearance; the tonsils and uvula were inflamed, showing recent congestion; the wrists of both hands were swollen and painful; the right knee and ankle were painful but not swollen. The heart was quite normal; the pulse 90 and regular. A week after admission there was much pain in the left hand and redness over the ulna, but very little swelling. There was also pain in the right foot over the metatarso-phalangeal joints. Four days afterwards there was a sudden rise in temperature to nearly 103° F. and then a rapid fall to subnormal,—97.5° F. There was a corresponding rise the next day and a similar fall. This was repeated for several days, and a week afterwards there was a rise to 103° F. and then a fall to the normal. This recurred on the following day, and two days afterwards the temperature became subnormal, falling from 98° F. to 96.5° F. There was no rise above the normal subsequently. During the period of irregular rises of temperature there were headache, stiff neck, much swelling of the left wrist and the elbow, and free sweating. Nine days afterwards there was much pain in the calf of the left leg, with tenderness,—due, no doubt, to neuritis. There was also continued pain in the right wrist, with much enlargement, and we kept the limb on a straight splint. In ten days the pain subsided and there was a general improvement. The treatment in this case was at first our usual mixture of salicylate of sodium, administered at frequent intervals. Afterwards the treatment was directed to the general nutrition, and cod-liver oil was administered. Locally we applied hot solutions of soda to the wrists and a blister above the right wrist, and, besides keeping the limb at rest upon a splint, we applied a solution of iodine.

You will observe that when this case was first admitted we had the ordinary signs of rheumatic fever,—the temperature being only slightly raised,—and then there were certain points differentiating it from the ordinary run of rheumatic fever. (a) The small joints of the fingers were attacked early, and soon after the metatarso-phalangeal joint of the foot. (b) The pain did not subside in the way usual in rheumatism, although the ordinary treatment by salicylates was put in force. Usually the pain and swelling subside within a fortnight; here the disease was protracted to thirty-seven days. (c) The symptoms as regards the joints, especially the severity of the suffering and the amount

of the swelling, were not correlative with the temperature. At first the temperature was comparatively low, though there was much inflammation of the joint. Then there were sudden rises and falls without associations with the joint-symptoms. There was a sudden drop to the subnormal, when there still existed a great swelling and pain in the left wrist and elbow. (d) At a later period there was severe suffering in one joint,—the right wrist, which we kept upon a straight splint. (e) There was no heart-affection, although such very severe articular inflammation. (f) There was neuritis shown by the pain and tenderness in the muscles of the calf.

We will now turn to Case II. A man, aged thirty-one, was admitted, complaining of pain in the back and in the joints of the lower extremities. There was a history of a tendency to true rheumatism as regards the father and brothers. The man had had no previous illness. He took a great deal of alcohol and worked a crane on a ship's deck, and was therefore much exposed to extremes of temperature. He had swellings of the knees and ankles, and the sour sweat of rheumatism ; pulse 92, temperature 102.5° F., heart quite normal. The symptoms, therefore, were those of acute rheumatism. He was placed under the usual treatment by salicylate of sodium, and in addition a draught containing opium on rare occasions. At first the swellings with the pains became sufficiently reduced ; but a fortnight after admission there was great suffering in the joints of the upper extremities as well as in the knees, and the temperature rose to 104° F. There was a remarkable erythema of rheumatic form over the chest and abdomen and over the flexor surfaces of the arms ; the tongue was dried and glazed and there was herpes about the mouth. A week afterwards the pain ceased and the temperature became normal. Four days subsequently, however, there was a return of intense pain in both knees, followed three days afterwards by pain in the wrists, and we applied ice-bags to the joints. In the left knee there was much effusion. Later, there was severe pain in the left shoulder. A gradual improvement occurred, and the patient was able to get up, but still had severe pain and enlargement in the left knee. You will notice that in this case there was arthritis with high temperature at first, but when the more painful symptoms occurred there was a sudden drop to the normal. Subsequently there were great irregularities of the temperature in no definite relation to the joint signs.

CASE III.—A young woman, aged twenty, was admitted under my care with the ordinary signs of rheumatic fever. She had previously had a disease, at the age of fourteen, for which she was treated

at a provincial hospital, when her knees and ankles were affected, and she manifested sore throat. In all probability this was an attack of rheumatic fever. On her admission she showed signs of mitral regurgitation, for a systolic murmur was manifest at the apex of the heart, the result, no doubt, of former rheumatic endocarditis. She was placed under treatment by the salicylates. Her temperature, which showed a maximum of 101° and 102° F., in four days fell to the normal, and in six days to subnormal,—97° F.; and when the temperature was subnormal a severe pain was felt in the left calf, probably due to neuritis; there was also a painful arthritis in the right ankle. Twelve days after admission there occurred severe pain and less swelling in the right knee, although the pulse was then 88 and the temperature subnormal,—97.4° F. The pain in the right knee continued for a long period. During her stay in the hospital the heart became much swollen and the right side dilated, but in a week there was a recession of this swelling and a return to the conditions as before. In this case, then, which undoubtedly showed signs of acute rheumatism, there was a swelling and pain of nearly all the joints—polyarthritis—for five days. Then there was mono-arthritis—the right ankle being affected —for two days, accompanied by neuritis in the calf. Lastly, there was a very severe mono-arthritis in the knee for thirty-five days. The treatment of this case was at first the ordinary treatment by salicylates, then iodine and belladonna applications were frequently repeated over the painful joints. Lastly, the ice-bag was kept to the right knee until the signs of inflammation and thickening began to subside, and then the limb was dressed with Scott's dressing and kept at rest on the splint. The result was that good useful movement was ultimately obtained.

It is obvious, then, that these three cases presented great differences from those that we are accustomed to consider as instances of true rheumatism, and we may consider why they deviated from the normal, a question as much important for diagnosis as for treatment. You will notice that these patients were comparatively young. It is more common to get deviations from the type of rheumatism on the lines I have just now indicated after the age of twenty-five. Several interesting examples have been recorded by Dr. Donald Hood (*vide Transactions of the Medical Society* of London for 1888, vol. ii. page 179). Now, there was no traceable association in these cases with gout, but to my mind there was a very strongly pronounced association with osteo-arthritis. It seems to me that a tendency to osteo-arthritis was ingrafted, so to speak, on to the undoubtedly rheumatic disease

from which these patients suffered, and I am of opinion that we should ascribe the modifying tendency to a disturbance of the spinal cord. We know that acute inflammation of the spinal cord, as in cerebro-spinal meningitis, may be attended with pain, swelling, and redness of the joints, closely resembling the signs in acute rheumatism, and yet there are manifestations of no other rheumatic affection. I have had some interesting experiences lately as to the effect of influenza in producing a like series of events, the inflammation of many joints with severe pain, almost indistinguishable from rheumatism, but suddenly ceasing with a rapid fall in temperature and unattended by any other rheumatic signs. Again, I have observed in very late periods of the disease an intense inflammation of a single joint, closely resembling

FIG. 1.

The hands and arms of a young woman with acute osteo-arthritis (not rheumatic). The fingers show many distortions, especially curvings between the joints of the first and second phalanges, the curves being towards the palmar aspect, whilst the terminal phalangeal joints show curves in the opposite direction. The muscles of the forearms and upper arms were much wasted.

osteo-arthritis, and in these cases I have had abundant evidence that there is an inflammatory or other change in the spinal cord and its membranes. We also well know that certain chronic diseases of the spinal cord, as tabes dorsalis, are attended (as shown by Charcot) with destructive inflammations of the joints. In some cases the joints are profoundly altered, but the changes are in the nature of an atrophy of the tissues not attended with severe pain. In other cases there may be alterations indistinguishable from those of osteo-arthritis and the pain may be severe. Dr. Buzzard, considering that in some of these cases there is a coincidence of gastric crises with the lesions of the bones and joints, thought it probable that the first cause might be an invasion of parts of the medulla oblongata closely adjacent to the roots of the

vagi nerves. He questioned whether there might not be something which we may call provisionally a trophic centre for the osseous and articulatory system in the immediate neighborhood of the roots of the vagi, and he said that this mode of considering the observed facts probably helps to throw light on the obscure pathology of arthritis deformans. ("On the Affection of Bones and Joints in Locomotor Ataxy and its Association with Gastric Crises," by Thomas Buzzard, M.D., F.R.C.P., *British Medical Journal*, March 5, 1881, page 330.) The tendency of further experience is, I think, to confirm this view, and I am inclined to the opinion that in the cases which I have detailed to you, in

FIG. 2.
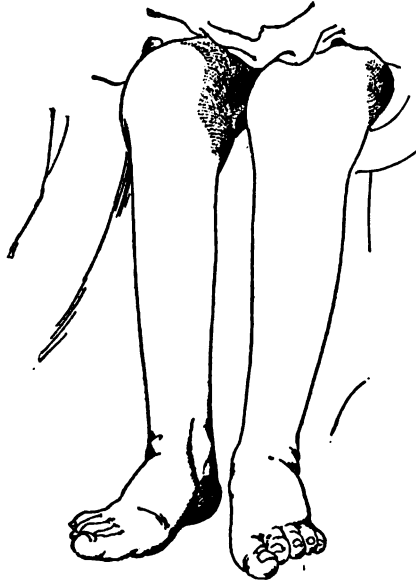
Knees of the same patient as Fig. 1.

which there was evidently acute rheumatism, there was a modifying influence which I will provisionally call the "arthritic tendency," or proclivity to osteo-arthritis, and that this complication was really due to a disturbance of a certain area of the spinal cord. Practically, then, let me enforce these points: When you meet with a case of acute rheumatism in which the small joints of the fingers are affected early in the disease (see Fig. 1); when, in any case, the pains and swellings of the joints do not subside with the salicylate treatment nor with the subsidence of temperature; where there are vagaries of temperature having no relation with the painful signs and swellings of the joints;

where there is severe suffering with great enlargement and tenderness of a joint or of joints and yet a low body temperature; when the swellings of most of the joints have subsided but yet severe suffering continues to be manifested, then suspect that another cause besides ordinary rheumatism is at work. You have the non-rheumatic grafted upon the rheumatic arthritis. Remember also, when you are called to a case manifesting painful swellings of the joint, that these are not always rheumatic. There may be an acute osteo-arthritis in the pathology of which rheumatism has no share. (See Fig. 2.) You must make your diagnosis between these conditions, but remember that both diseases may coexist in the same patient.

The cases I have detailed will have sufficiently indicated our general plans of treatment. The most important points are rest and careful local treatment of the joints, after it is found that the salicylate treatment has not sufficed to reduce all the pains and discomforts. For local relief of the joint, as well as for the arresting of the morbid processes which are characterized by intense inflammation, I believe the use of the ice-bags to be most valuable. It is true that in some cases they are not well borne, and in those I have adopted the plan of applying locally hot solutions of salicylic acid or an ointment of salicylic acid with turpentine spread on lint over the joint and covered by a flannel bandage, as recommended by Professor Bourget, of Lausanne. A local hot-air bath has also proved of service in some cases. The most important point is rest upon the splint, and other means, such as I have indicated, should be adopted to reduce the pain and swelling. Next, it is of the highest importance to treat the case by tonics, and cod-liver oil is the most useful. In the latter stages massage, with carefully-arranged baths and douches, may prove exceedingly valuable.

A CASE OF TYPHOID FEVER; NUMEROUS INTESTINAL HEMORRHAGES, THE AMOUNT OF BLOOD LOST BEING SEVENTY-EIGHT AND A HALF OUNCES; AND OBSTINATE VOMITING, WITH RECOVERY.

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GENTLEMEN,—The first patient is R. E., age twenty-two, occupation housework, nativity German. The family history is practically negative; the father died of sea-sickness, while the mother is still living and healthy. The patient has three brothers and four sisters, all in good health; has lost two sisters, one as the result of an extensive scald and the other of some unknown cause. She was well, as a rule, when a child, though she had measles, whooping-cough, and a few other complaints. Subsequently was quite well till about one year ago, when bilateral suppurative ovarian disease developed. For this condition she was operated upon in the Philadelphia Hospital, both ovaries being removed. She made a good recovery, and afterwards enjoyed good health till two months since, when she was admitted to the Medico-Chirurgical Hospital (June 27). Prior to admission she had for two weeks been complaining of headache, anorexia, slight pains in the lower extremities, and occasional dizziness with languor. These symptoms slowly and gradually grew more intense, and for a few days previous to the time of coming into the hospital, they were accompanied with alternating sensations of chilliness and feverishness, together with intense thirst. On the morning of the day she was admitted, was ambitious to continue at her work, but suddenly becoming dizzy, she fell to the floor, when she was removed to this institution.

I shall begin a recital of the symptoms and course of the severe attack, from which she is recovering, by calling your attention to the

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temperature record. It is to be remembered that the second week or fastigium of the disease had been reached a day or two before she was admitted. The temperature when first taken was 102° F., and during the next ten days it varied from 101° to 104½°. (See Chart I.) As a rule, there were morning remissions and slight evening exacerbations, but rarely the morning temperature was higher than the evening. There was nothing unusual about the concurrent symptoms during the second week of her disease, or the first week of her stay in the hospital. During the latter period the diagnosis of typhoid fever was made, owing to the presence of an enlarged spleen and the characteristic typhoid eruption, which appeared two days after her admission.

CHART I.
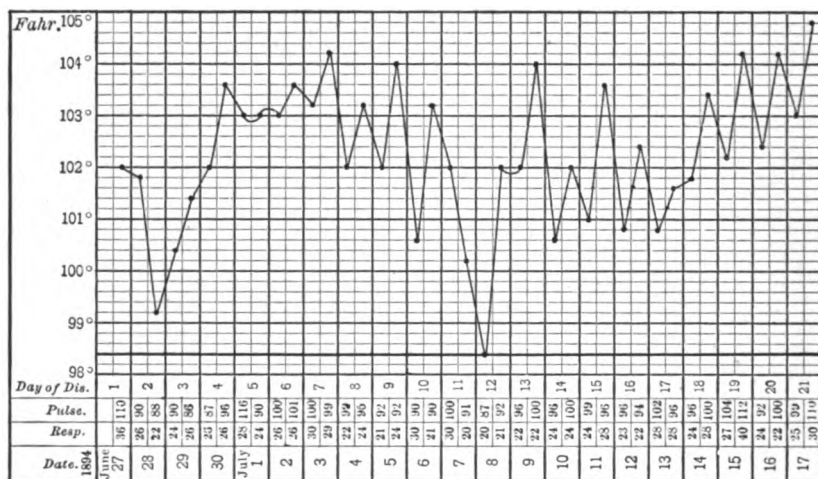
During the third week of the affection (second week of stay in hospital) there were developed such usual symptoms as mild delirium, particularly at night, trifling diarrhœa,—from two to three bright yellow stools daily,—and there also appeared grave features of exceedingly great interest. On the tenth day after the date of admission the temperature, it will be seen, fell from 103° F. to the normal point within thirty-six hours without apparent cause. About ten hours later blood was passed by the bowel, the amount being half a pint. After the latter occurrence the temperature rose again, not only to its former height but higher still, and so continued for another period of ten days, when there was another sudden great depression in the curve followed by a large hemorrhage from the bowels. Again the

temperature went up as high as it was previous to the second hemorrhage, and showed no signs of defervescence till the beginning of the fifth week. (See Chart II.) Subsequently the temperature-curve became markedly irregular and the morning remissions touched the normal level, while the evening exacerbations touched 101° F. and even 102°. This period of irregularity and steep temperature-curves constitutes the so-called ambiguous period of Wunderlich, and it corresponds to the period of decline or convalescence in mild cases.

CHART II.
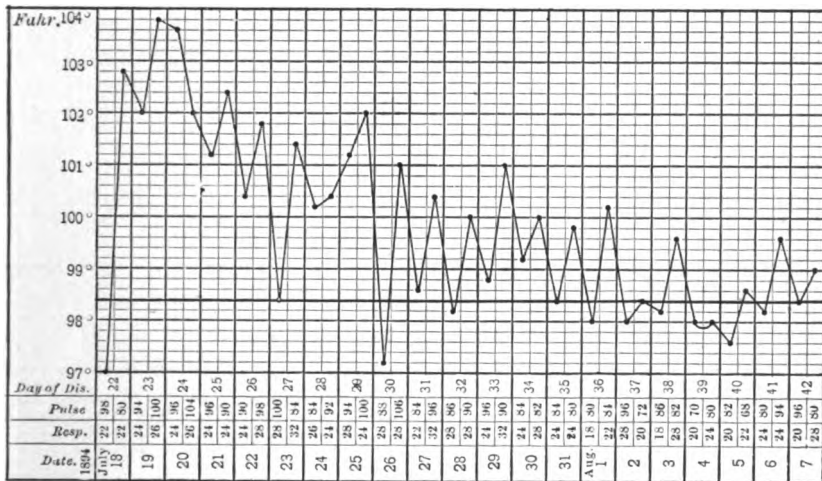
Then came a long period of defervescence or decline in the temperature, lasting not less than two weeks, during which time the morning depression frequently touched the normal while the evening temperatures remained high, though the latter also reached the normal finally. (See Charts III. and IV.) The febrile period in this case was not less than seven weeks in duration. Moreover, after the temperature had remained normal and subnormal for one week, slight evening exacerbations occurred once more and continued for nine or ten days. The retarded period of decline of the temperature was probably due to the presence of sluggish ulcers in the intestines, inasmuch as the hemorrhages of the bowels continued at short intervals till the fever had run its entire course. The exacerbations of temperature that occurred after the temperature had been normal for some time were probably in great part due to the marked anæmia from which the patient was suffering at the time in consequence both of the large hemorrhages and the specific fever.

Reference has been previously made to the occurrence of intestestinal hemorrhages, and in this case they were both numerous and (some of them) copious. As before stated, the first occurred ten days after admission, and the second ten days later, or on July 19. Following the latter smaller hemorrhages occurred on July 20, 22, 24 (a copious hemorrhage), 25, 26, 28, 30, August 3, 5, 9, 11, 13, and the

CHART III.

Fahr.100° / 99° / 98° / 97°
Day of Dis.: 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63
Pulse: 86 80 / 84 96 / 88 90 / 80 80 / 90 84 / 92 78 / 84 85 / 80 84 / 80 80 / 90 94 / 90 90 / 90 40 / 84 85 / 24 110 / 90 100 / 78 85 / 90 85 / 84 90 / 91 100 / 90 118 / 80 84 / 90 100
Resp.: 22 24 / 22 20 / 20 22 / 22 20 / 24 20 / 24 21 / 24 24 / 22 20 / 22 20 / 22 20 / 20 20 / 20 18 / 24 28 / 20 20 / 44 20 / 20 18 / 20 20 / 22 24 / 22 24 / 24 25 / 24 20 / 20 20
Date. 1891: Aug. 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28

last on August 15. The amount of blood lost on each of these occasions was eight ounces, eight ounces, four ounces, four ounces, two ounces, one and a half ounces, half an ounce, one ounce, four ounces, two and a half ounces, three ounces, four ounces, three ounces, two ounces, eight ounces, two ounces, two ounces, four ounces, eight ounces, three ounces, two ounces, and two ounces. On six different days two

CHART IV.

Fahr.100° / 99° / 98° / 97°
Day of Dis.: 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84
Pulse: 84 100 / 98 96 / 108 108 / 98 98 / 99 100 / 96 98 / 99 98 / 96 98 / 97 100 / 91 104 / 96 96 / 96 99 / 98 100 / 97 88 / 88 90 / 90 91 / 94 88 / 90 / 87 90 / 87 90 / 88
Resp.: 22 24 / 21 24 / 25 28 / 21 20 / 26 23 / 21 20 / 18 18 / 18 20 / 18 13 / 20 19 / 21 22 / 21 24 / 23 22 / 21 20 / 19 19 / 20 19 / 19 / 19 18 / 19 19 / 18
Date. 1891: Aug. 29, 30, 31, Sep. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18
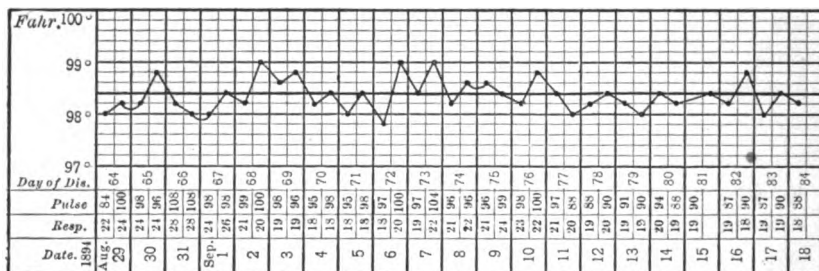
bleedings occurred. The total amount of blood discharged from the bowel was therefore seventy-eight and a half ounces, or two quarts and fourteen and a half ounces. That the loss of blood was the direct result of erosion of a vessel in connection with an intestinal ulcer is shown by the time of occurrence of the first hemorrhage, which took place on the tenth day after admission or about the sixteenth day of

the affection. I had never before seen a case of typhoid fever in which so much blood was discharged, in which recovery had ensued. During the past summer there was treated in the wards of our hospital a case of typhoid in which repeated hemorrhages of the bowels occurred, the amount of blood lost having been about three pints, with a fatal termination. Free bleedings from the bowel during typhoid fever are doubtless of ominous significance, and yet the facts relating to this feature in the case before us show that, even though the amount of blood lost is enormous, recovery is not out of the question. I frequently have observed copious hemorrhages in typhoid to be followed by a gradual decline in the temperature, and this in turn by an uninterrupted convalescence; but in this instance three hemorrhages, each consisting of half a pint, had occurred before the case had entered upon the period of convalescence. After the second large hemorrhage, the spleen underwent sudden and considerable diminution in size, an interesting fact, which others as well as myself have noticed heretofore. It is interesting to remark that, during the present season, in which the usual typhoid epidemic has been, so far as my own observation extends, more severe than the average, the percentage of cases in which hemorrhage of the bowels has occurred has been rather high. Thus, of fifteen cases treated by myself, this symptom has been presented in four. I may add that the average percentage of cases of typhoid in which melæna occurs is, according to the statistics of the Munich Pathological Institute, which were based upon two thousand cases, from three to five per cent.

Another symptom which proved to be exceedingly obstinate and depressing in its effects was vomiting. This occurred for the first time immediately after the first hemorrhage. It lasted for about twenty-four hours, during which time she was unable to retain anything on the stomach. With the appearance of the second hemorrhage, ten days later, the vomiting recurred, and again for a period of a couple of days nothing was retained that had been swallowed, and the patient was supported entirely by rectal alimentation. Subsequently the vomiting occurred at short intervals, during periods lasting from one to three days, when nothing more than one drachm of good brandy, together with a half-ounce of lime-water, could be borne by the stomach. It can be asserted safely that this patient was supported per rectum, so far as food was concerned, for not less than two weeks, notwithstanding the depressing effects of the hemorrhages and the oft-repeated vomitings. I do not wish to imply that life was uninterruptedly supported solely by rectal feeding, since for a day or two at a time some little

nourishment was taken by the mouth and retained. Rectal alimentation was continuously employed for a period lasting over three weeks, and I repeat that the total number of days on which nothing could be taken *per orem* was not less than fourteen. After the occurrence of the hemorrhage on the 30th day of July, which was copious, her life was totally despaired of, since her condition indicated imminent death as a result of general collapse. It is doubtless true that it was owing to the assiduous efforts of the faithful resident physician and nurse that life was reclaimed. Some measure of credit, however, belongs to the strychnine, which was introduced with a free hand, hypodermically. She rallied and appeared to hang in the balance for many days, when at last the powers of nature seemed to gain the upper hand, and she slowly and gradually convalesced. The fact that vomiting occurred at the time of the various copious hemorrhages would go to show that the ulcer from which the blood came was situated high up, possibly in the stomach itself, but there was no blood in the vomitus at any time. It may have been in the upper part of the small intestine. Ulcers, however, do occur in the stomach in cases of typhoid fever very exceptionally, as shown by a few autopsies.

A word with reference to the condition of the pulse. During the first two weeks it varied in frequency from 90 to 110. After the occurrence of the first hemorrhage it became markedly dicrotic; after the second large hemorrhage it became small and irregular, as well as dicrotic. It is ofttimes a difficult problem to differentiate marked dicrotism from mere irregularity of the pulse-beats. It must be confessed that this is not always possible. With the use of the sphygmograph, irregularity in time or intermittence can be easily distinguished, but it is to be recollected that an intermittent pulse may be associated with irregularity of the heart's action without intermittency of cardiac action, some of the heart-beats being too weak to give rise to a palpable pulse at the wrist. The heart should be auscultated in doubtful instances while the pulse is being felt. This method was practised in this instance, and will also enable you to distinguish, in some cases at least, irregularity of the pulse from marked dicrotism. The diagnosis in this patient presented no difficulty, inasmuch as the symptoms and course were, during the first two weeks, entirely typical. The history of gradual onset, the peculiar temperature-curve, to which I called your attention, the enlarged spleen, followed by the characteristic eruption which appeared in many successive crops, place the diagnosis beyond peradventure.

The prognosis was for a long time grave : the height of the tem-

perature, together with the length of the fastigium, showed the type of infection to be severe. The complications present—namely, vomiting and hemorrhage of the bowels—were both intense and obstinate. This case well exemplifies the aphorism that no case of typhoid fever is too ill to recover when carefully nursed and energetically treated.

The treatment pursued in the present instance embraced nothing of an unusual character, save, perhaps, that portion which pertained to the feeding. I feel convinced of the fact that had rectal alimentation not been resorted to, recovery would not have ensued. It was instituted as soon as it was found that an inadequate amount of nourishment could be taken in the usual manner. Each injection consisted of eight ounces of pancreatized milk, two drachms of bovinine, and a half-ounce of whiskey. From time to time laudanum—10 drops—was added, as the rectum manifested signs of irritability. At first injections were made at intervals of three hours. Subsequently the interval was lengthened to six hours,—as soon as a slight amount of liquid food could be taken by the mouth. Even late in the affection the patient was supported for a day or two at a time by rectal alimentation. The usual keen appetite witnessed in convalescing typhoid patients was not observed in this instance till convalescence was far advanced. The extent to which the rectum tolerated this method of feeding was a source of astonishment to all connected with the case. I may say, however, that I have observed this peculiarity in previous cases of typhoid fever, and it was this fact that led me to believe that good results might be obtained by resorting to it in this instance. Fortunately, the stomach is not often in a rebellious temper in cases of typhoid fever, and should it be in any case that you may meet with, I would urge you strongly not to lose sight of this means of bridging the patient over dangerous periods.

The cool-bath treatment was employed till the occurrence of hemorrhage of the bowels, when it was discontinued because of the belief, which I firmly entertain, that to keep the patient at absolute rest under those circumstances is the first indication. It is not improbable that the use of the cool bath up to the time of the occurrence of the bleedings enabled the patient the better to bear the debilitating effects of the subsequent serious events. It should be stated that a moderate diarrhœa began prior to the occurrence of the hemorrhages, and persisted throughout the course of the case, the stools numbering from two to four daily. For this symptom, and as a part of the routine treatment, the most popular intestinal antiseptic, salol, was employed continuously in doses of three to five grains, every three hours. For

the intestinal hemorrhages the ice-bag externally and hypodermic injections of ergotine were used with a fair degree of success. Subsequently, when the tendency to almost constant oozing showed itself, the following pill was substituted for the ergotine:

> ℞ Plumbi acetat., gr. ii;
>   Extract. opii, gr. ¼.
> Ft. pil. no. i.
> Sig.—One every three or four hours.

This seemed to exercise a favorable controlling influence, since but one large hemorrhage occurred after its employment. As has been already hinted at, strychnine was exhibited liberally from the time of the first hemorrhage till almost complete convalescence was reached, and that it yielded strikingly good results I have no doubt.

On July 26, when the most dangerous symptoms arose, with every indication of approaching collapse, the stomach utterly non-retentive, and when the patient was almost absolutely pulseless, strychnine alone was relied upon, the dose at this time having been one-fifteenth of a grain every couple of hours, and later one-thirtieth of a grain at somewhat longer intervals.

A CASE OF INFECTIVE OR ULCERATIVE ENDOCAR-DITIS AND ERYTHEMA MULTIFORME, WITH REMARKS UPON ULCERATIVE ENDOCARDITIS IN GENERAL.

BY THOMAS OLIVER, M.A., M.D., F.R.C.P.,

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GENTLEMEN,—We have less difficulty in recognizing infective endocarditis now than formerly. In it, as in other diseases, even admitting the serious nature of the malady, the diagnosis is the hand-maid of treatment. It will, I think, be admitted that since the treatment of ordinary heart-disease has been conducted on lines more truly scientific, and on physiological principles, lives that were doomed have been rendered more comfortable and the longevity of cardiac patients has been increased. There is still much to be learned in regard to the pathology of infective endocarditis and the part played by micro-organisms therein. It has been maintained that the disease in question presupposes, in most instances, the existence of some weakened spot or an abraded surface of the endocardium. Clinical experience and experimental investigation rather lend the weight of their support to the validity of this statement. In Byrom Bramwell's experience,[1] the introduction of material from ulcerated aortic valves directly into the blood-stream of healthy rabbits was not followed by any special result. Whilst his results were negative his experiments are none the less valuable. Wyssokovitch, under the supervision of Professor Orth, continued the experimental investigation of ulcerative endocarditis artificially produced in the lower animals, and he found that if he passed a fine probe down the carotid artery of a rabbit and abraded the aortic valves, the injection into the blood-vessels of cultures of micrococci taken from

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[1] American Journal of the Medical Sciences, 1886.

pus was followed by the development of symptoms similar to those of ulcerative endocarditis, and at the post-mortem the typical lesion of the valves was found. Where simple injection of the infective material was made without injury to the valve, Wyssokovitch, like Bramwell, failed to develop infective endocarditis. These experiments, therefore, rather lead us to infer that a weakened or diseased surface of the valve is a necessary prelude to ulcerative endocarditis, and when we reflect upon cases of ulcerative endocarditis that we have met with in practice, we must admit that there has frequently been a history of a previous rheumatic heart-affection, although in a few patients no disease of that organ was known to have existed. On this point it is interesting to mention that in a case of ulcerative endocarditis in which the bacillus diphtheriæ was found, Howard[1] states that the endocardium was quite healthy, and Professor Ribbert, of Bonn, after injecting large quantities of infective material taken from cultivations of staphylococcus aureus into rabbits, without previously injuring the aortic valve, produced in most animals an infective myocarditis with foci of suppurative action, whilst in others there was, in addition, a vegetative endocarditis affecting the mitral valve. According to Sansom,[2] "Septic endocarditis in a great majority of cases affects an old valve lesion, but it may attack valves presumably healthy."

Perhaps in one-fourth of the cases of ulcerative endocarditis there has been some pre-existing local condition. The disease differs locally from ordinary rheumatic endocarditis in the greater tendency to destruction of tissue and in the presence of micro-organisms in the valves. Rheumatism may predispose to the disease, or become itself later on associated with micro-organisms,—e.g., diplococci. It is because ulcerative endocarditis owns a microbic cause that it is particularly prone to develop in the course of diseases in which the blood is poisoned. In women who are suffering from puerperal fever, infective lesions of the endocardium are specially prone to arise. Osler, who has given considerable attention to this subject, maintains that eleven per cent. of his cases of ulcerative endocarditis were related to puerperal fever. When we know how, in this disease, the already poisoned blood of pregnancy becomes additionally charged with material absorbed from the uterus and the tendency for thrombosis to occur, we can readily understand how easy it is for the heart to become affected, and, as the right side of that organ is the first to receive the morbid stream, its lining membrane may

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[1] American Journal of the Medical Sciences, December, 1894.
[2] Diseases of the Heart, p. 52.

become primarily the seat of infection. In any case, once ulcerative endocarditis has become developed, and particularly in the disease we are now speaking of,—viz., puerperal fever,—the patient runs all the risks of emboli becoming detached and of being carried in the blood-stream into various internal organs. All septic conditions of the blood are more or less attended with this risk. Infective endocarditis has even followed very slight injuries when the wound has become unhealthy. In one disease there is a special proneness of the valves thus to become affected, and that is pneumonia. In the acute stage of the illness, at a time when the crisis is expected, or, later on, when the inflammatory exudation is clearing away and when resolution and absorption are taking place,—at a period, therefore, when the patient seems to be progressing favorably,—he runs the risk, if the atmosphere he is breathing is unhealthy, or if the pneumonic products in the lung become septic, of developing and dying from ulcerative endocarditis. This intimate relationship of pneumonia and ulcerative endocarditis has been clearly demonstrated by Netter, of Paris, by whom it is maintained, by the way, that in one-half of his cases there was no pre-existing disease of the endocardium. Passing without much difficulty into the blood-stream, the pneumococci readily attack the endocardium itself or find in the fibrin deposited on the valves of the left ventricle a suitable nidus for their development, or, penetrating the small blood-vessels at the base of the mitral valves, they cause embolism thereof, multiply rapidly, and induce necrosis of the surrounding tissues. That the cocci of pneumonia are a cause of ulcerative endocarditis is a fact long since placed beyond dispute. Netter investigated eighty-two cases of ulcerative endocarditis related to pneumonia, and he found in seven cases of endocarditis consequent upon this pulmonary affection the same kind of microbes in the lesion of the valves as in the inflamed lung. Injection of cultivations of the microbes, taken from pneumonic lesions, into the lungs of rabbits whose cardiac valves had been experimentally irritated caused endocarditis, with exuberant vegetations; and, so far as our purpose is concerned, there is no difference in the pathology of infective or ulcerative, and verrucous or vegetative, endocarditis.

In a previous paper in the INTERNATIONAL CLINICS for January, 1892, I incidentally drew attention to the association of ulcerative endocarditis and peliosis rheumatica. Several forms of purpura hæmorrhagica are now known to be dependent upon microbes. In one of my own cases of purpura rheumatica myriads of the streptococcus pyogenes aureus were found in the blebs of the skin, and Bramwell has demonstrated in ulcerative endocarditis the presence of microbes in the

deeper layers of the dermis. The epidemics of influenza that lately passed over this country have given us frequent opportunities of observing ulcerative endocarditis as a consequence of this peculiarly anomalous disease. Under certain circumstances, so slowly and insidiously may ulcerative endocarditis develop that all history of injury may have been forgotten by the patient. In some cases the disease may be consequent upon absorption from an internal focus, from a collection of pus in the pelvis or around the cæcum, or from a calculous pyelitis, as in the second case hereafter alluded to. In many cases, on the other hand, no local origin of the disease can be demonstrated.

As illustrating a very interesting relationship, I shall describe a case of long-standing heart-disease, in which, whilst the patient was undergoing treatment and apparently when everything was going on well, the temperature gradually rose shortly after the appearance of a rash on the skin,—viz., erythema multiforme.

Isabella Q., aged twenty-seven years, a hawker, was one of two sisters who first came under my care fourteen years ago, both suffering from heart-disease. The youngest sister died at that time from mitral stenosis, whilst Isabella, the subject of these remarks, recovered, but, of course, incompletely. From time to time within the last fourteen years the patient has been admitted into the infirmary for a few weeks' treatment and rest. She always recovered sufficiently to be able to follow the very much exposed calling of a hawker. It is unnecessary to go into the details of her condition when I first saw her, many years ago. It will be sufficient for our purpose if I deal with her from her second last admission into the infirmary, in July, 1893. Her family history is good. Beyond the death of the sister already alluded to, there is nothing calling for comment. She has had a comfortable home, but has always been delicate. She had rheumatism for the first time fourteen years ago, since which she has had several attacks. Seven years ago she began to suffer from palpitation, shortness of breath, accompanied by œdema of the feet and legs. The patient is in the habit of taking alcohol, but never to excess. Seven weeks ago the patient was seized with pain in the epigastrium, extending across to the liver. It was constant, but was aggravated on taking food. There were also precordial pain, palpitation, cardiac distress, and difficulty of breathing. Beyond a few rhonchi, the lungs are healthy. The heart is felt beating two inches below the left nipple and in a line with it. Its beat is well sustained; the interval between the beats is unnaturally long and irregular. No thrill is felt. A systolic murmur is heard over the

whole of the cardiac area, but principally over the apex; here it is long, and is followed by an indistinct second sound, which at times is reduplicated and at others has the character of a soft murmur. Over the pulmonary artery the systolic murmur is rough, and is followed by a loud second sound, whilst over the aortic area the systolic murmur is soft and the second sound feeble and not well defined towards its termination. The pulse is 48 per minute; the beats irregular. The pulse-tracing shows high arterial tension. The liver dulness measures four

FIG. 1.

Isabella Q., July 18, 1893. Loud rasping systolic mitral murmur, also systolic aortic; pulse irregular, only 48 to the minute. She is not taking digitalis.

and a half inches in the nipple line; the splenic dulness is not increased. Under treatment, the patient improved and left the infirmary on August 12, but she returned on September 20, suffering from shortness of breath and cough, readily relieved by ether and strophanthus. Under treatment, the urine, which at first was scanty, rose in a few days to twenty-four and then to seventy-two ounces. During October, when the patient seemed to be improving, she was given quinine with the object of creating a little appetite, digitalis was substituted for strophanthus, and, as she was not sleeping well, a few doses of paraldehyde were given. On the evening of the 22d of October her temperature was 100° F., but, as she was now sleeping better, diminishing doses of paraldehyde were given (Fig. 2). During the next two days there was nothing unusual in her temperature, but the patient was not quite so well; she complained of pain in her back and of headache. It was noticed that there was a rash on the forehead and on the back of the wrists (Fig. 3); it had a shotty feel to the finger; was papular and discrete. As the appearance of the rash was very strongly suggestive of small-pox, it was deemed advisable that the medical officer of health, Dr. Henry E. Armstrong, should see her. As his opinion was confirmatory of the suspicion of variola, patient was relieved of the presence of the other inmates of the ward and all precautions taken to prevent the extension of a supposed contagious disease. On the following morning the rash on the forehead and right side of face had become confluent. It had the appearance of large wheals; the skin was swollen and presented the appearance of erythema papulatum or multiforme. On November 1 the face was still swollen, and where the rash had been profuse there was very extensive desquamation; scales of a silvery character were

being thrown off, leaving a reddened surface underneath. The urine was scanty, and contained albumen but no blood; pulse was 94, irregular in rhythm and volume. No fresh development in her cardiac condition was observable, but it was noticed that she was extremely prostrate. Salicylate of bismuth and boracic acid were administered internally, and under this line of treatment the patient improved, the rash disappearing altogether. It returned, however, on November 5, on the back of the wrists and face, and was an exact repetition of the rash which had existed only a few days previously. It was papular; the face was swollen; the skin was hard and infiltrated and covered with thick, white scales, which kept peeling off. There was considerable thirst, and her throat was dry and tender, but her lips were so swollen and cracked that we could not examine her throat. There was œdema of the feet. Numerous râles were heard all over her chest and a systolic murmur over the aortic and mitral areas, the second aortic sound being very indistinct.

On November 11 it is noted that the patient is very ill. The skin of the, trunk is covered with a dry, reddish-brown papular rash. The bowels have been moved five or six times a day lately. The systolic murmur is extremely loud and rough; there are numerous râles in the lungs; the tongue is coated with a thick brown fur; the tonsils and uvula are swollen; the posterior wall of the pharynx is dry and red, but there is no deposit on its surface. Desquamation of the rash followed during the

FIG. 2.

FIG. 8.—Papular eruption on face and dorsal surface of wrists of Isabella Q.

next few days. On November 16, when seen at 2.15 P.M., the patient was semi-conscious; there was paralysis of the right arm and leg; the knee-jerk was absent. At 5.30 P.M. she was comatose; right hemiplegia complete; clonic spasms of left face: stertorous breathing. Death, 6.45 P.M.

Post-mortem Notes in Brief.—Extensive desquamation of the face, wrists, and chest; left lung consolidated in lower half. Heart: right ventricle hypertrophied and contains a large adherent clot; mitral valve thickened; numerous vegetations on it and extending along chordæ tendineæ and musculi papillares; aortic valve competent, but segments are covered here and there with vegetations. Heart and pericardium adherent to each other in places. Heart weighs seventeen and

FIG. 4

Ulcerative endocarditis.

three-quarters ounces. Spleen much enlarged and contains numerous infarcts. Left kidney contains numerous infarcts. Liver enlarged; weighs sixty-seven ounces; is soft and friable. Brain carefully examined, but neither was there blocking of vessels nor hemorrhage detected. In the vegetations removed from the mitral and aortic cusps, Dr. V. D. Harris, of London, who kindly examined the specimens, found numerous micro-organisms.

The heart here depicted (Fig. 4) is a good illustration of ulcerative endocarditis. The other picture (Fig. 5) is a representation of an impacted calculus in the kidney in the same patient, a male, who died of ulcerative endocarditis, and in whom the pelvis of the kidney was probably the source of infection.

The physical signs and symptoms of infective endocarditis are distinct and yet anomalous. In my own cases there have been extreme prostration,—a feeling of debility far in excess of any existing local or constitutional affection; frequent and profuse perspirations; rigors very occasionally and not well marked. Pulse has sometimes been rapid, at other times not; frequently it has been dicrotic. Temperature has been variable, sometimes as high as 104° F.; occasionally subnormal. There has been a distinct absence of relationship between pulse and temperature. Many of my patients have had practically no complaint beyond that of extreme debility. In some of the cases the urine has temporarily contained albumen; in others, again, there has been, in addition,

FIG. 5.
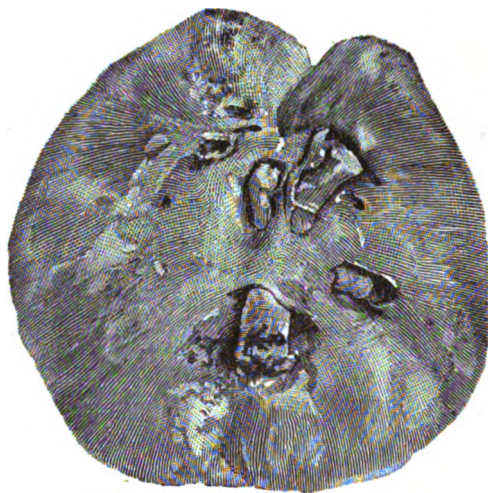
Impacted renal calculus.

blood, and in these the skin has frequently exhibited petechiæ or been the seat of purpura hæmorrhagica. So much for the constitutional condition. What about the heart? As the ulcerative lesion is frequently grafted on to an old-standing endocarditis, there is generally to be detected an alteration in the character of any cardiac murmurs; they become harsher and rougher in character, but this is not invariably so. In some of my cases, the murmurs that were present before the development of ulcerative endocarditis, or which appeared in its early stages, have disappeared and returned at a later date or not at all. I can recall one case, occurring in the course of influenza, where the aortic murmurs entirely and permanently disappeared, and yet at the post-mortem the aortic valves were found ulcerated and perforated. Car-

diac murmurs, therefore, may either become intensified, soften down, or disappear. Given a case where the disease is protopathic, the development of a cardiac murmur, systolic in rhythm, soft, and audible over a limited area, either the mitral or aortic, and accompanied by a feeble second sound over the aorta or pulmonary artery, in a patient who is more or less profoundly prostrated, frequently perspiring, and the subject of fever that exhibits great variations, say from three to four degrees between the evening and morning temperature, or without any rise of temperature at all,—the patient, a male, who is recovering from pneumonia or is ill with septicæmia ; or a woman, the subject of puerperal fever, in whom there occurs embolism of an internal organ ; of the brain, for example, and revealing itself by a limited paralysis; of the spleen, as suggested by complaint of pain in the back ; or of the kidneys, as indicated by the presence of blood in the urine,—in such a patient the diagnosis of ulcerative endocarditis may be suspected, and will in all probability be correct, if to these is added evidence of a quickly-enlarging spleen.

There are cases that have no definite history in which the temperature is irregular, the bowels loose, early prostration, somnolence, coma, sweatings, and petechiæ on the skin. Such cases are occasionally mistaken for typhoid fever. Osler differentiates these from typhoid fever by the pulse showing greater variations, by the prostration being greater in the very early stages than in enteric fever, by slight rigors recurring from time to time, by signs of embolism, and by a temperature more prone to show high elevation with sudden falls to the subnormal. These are just the cases in which experience has led me to regard the intestine as probably the source of the poison. They resemble closely and yet they differ from typhoid fever, both in the points already alluded to and in the tendency to the development of purpura hæmorrhagica. In two such cases I found ulceration of the intestine, but not in the neighborhood of Peyer's patches.

In infective or ulcerative endocarditis the blood is poisoned. It contains microbes which attack and penetrate a previously diseased valve, or the blood itself contains some poisonous material which first reacts upon the surface of the valve, and thus allows of their penetration by micro-organisms. Microbes, not of one special order, are, so far as the heart is concerned, present in the vegetations, in the floor of the ulcer, and in the deep tissues. These they invade, causing necrosis. It is interesting to remember that, whilst a cultivation from diseased valves is easily made, hitherto attempts to obtain cultures from the blood found in the heart have been, generally speaking, unsuccessful. In ulcerative

endocarditis, as in other diseases where the malady is due to a pathogenic germ, the question naturally arises, How much of the disease is due to microbes and how much to the chemical products the result of their vitality? In regard to the chemical pathology of infective endocarditis, Dr. Sidney Martin has lately made important investigations. These strongly confirm the opinion that infective endocarditis is not a pathological entity due always to the operation of one and the same kind of microbe. Many pathogenic agents are capable of producing it,[1]—e.g., the staphylococcus or streptococcus pyogenes aureus which has caused pus formation or the pneumococcus of Friedländer. In a chemical examination of the blood and spleen taken from a case of ulcerative endocarditis, Martin found albumoses and a non-proteid substance which in its non-purified state was acid. He was struck by the large amount of albumoses obtained from the spleen, an organ which seemed to play the part of a repository or factory of the chemical poisons. When tested experimentally, these albumoses produced fever and retarded the coagulation of blood. On this point it is worth noting that the experimental type of fever so produced bore a marked resemblance to that met with in the orignal disease. The pyrexia is not great. The presence of such albumoses in the blood exercises a varying influence upon nutrition, and they tend to bring about fatty degeneration of the heart. Just as each kind of microbe, when circulating in the system, is capable of giving rise to a series of symptoms that are purely special to it, so microbes generally develop chemical products the presence of which in the blood is followed by symptoms that can only be regarded as special or pathognomonic. If this is found to be an invariable fact, and Martin seems to have already demonstrated it for several infective processes, then the well-known requirements, insisted upon by Koch for fixing the specific relationship of any one microbe with a particular disease, may have to be extended so as to include a similar definite relationship between the chemical poisons obtainable from the tissues and the disease naturally or artificially established.

If there is one fact that is characteristic of ulcerative endocarditis it is *enlargement of the spleen.* This organ enlarges rapidly. Acting the part of filter from the mechanical slowing of the circulation of the blood that occurs therein, it is supposed that within the spleen proteid matter is digested either by micro-organisms or ferments. " It is from the proteids of the spleen that the specific poisonous products are mainly formed which serve as the food, so to speak, of the infective agents,

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[1] Local Government Board Medical Report, 1891-92.

primary or secondary." In nearly all post-mortems on ulcerative endocarditis, one is struck by the large beads of fibrin that are found on the valves; and it is in these, on microscopic examination, that colonies of micrococci are extensively found. Their presence therein is something more than a simple accident. Just as in the spleen suitable pabulum is found for infective microbes, and in the alkaline effusions of the body certain bacilli find all they require, so does the fibrin of the vegetations on the valves of the heart offer a suitable nidus for the development of the microbes of ulcerative endocarditis. Experimental pathology has still to determine the exact part, in the symptomatology of ulcerative endocarditis, played by the primary infective agent, the microbe; also the part played by the specific chemical products which it forms, and which are spoken of as the secondary infective agents. That these products have a strong physiological action there is no doubt. Martin has separated them, and he finds that they are of two kinds,—(1) proteids (e.g., albumoses and peptones); (2) non-proteid bodies. The albumoses of ulcerative endocarditis prevent or retard coagulation of the blood, and it is from their strong influence upon the blood that the grave nutritional defects are explained. The heart is apt to undergo fatty degeneration, and, as in infective endocarditis no change has been found in the peripheral or central nervous system, the degenerative changes in the myocardium are in all probability entirely due to the effect of the altered blood. Many albumoses, like vegetable alkaloids, are special cardiac poisons, and to this circumstance might partly be attributed the degeneration of the myocardium, for the skeletal muscles do not appear to be similarly affected. Dr. Sidney Martin has opportunely drawn attention to the production of chemical poisons in infective endocarditis, and, whilst medical opinion cannot as yet be definitely expressed in regard to their influence in developing symptoms, his investigations mark an important step in the pathology of this interesting affection.

So far the treatment of ulcerative endocarditis has not been very successful. The disease has in most instances proved fatal. In one case reported by Sansom the ravages of the disease were checked and the patient recovered. She died several months afterwards, and at the autopsy the remains of the cured lesion of the valve were quite apparent. In my own cases, once the disease has been fully established, I cannot say that I remember a complete and permanent cure, although I have been able to prolong life for a few months. As ulcerative endocarditis is generally the sequence of some form of blood-poisoning, the treatment, briefly speaking, is that of the septicæmia on which it de-

pends. Quinine may be given, and with some advantage, but the drug that has given me, on the whole, the most satisfactory results is sulpho-carbolate of sodium in half-drachm doses repeated three or four times a day. I believe in keeping up as far as possible an intestinal antiseptic condition in these cases, and frequently administer salol and β-naphthol. An effectual treatment has yet to be devised, and the line by which this is likely to be established will be the injection into the veins of some material possessing bactericidal properties, but yet harmless in its effects upon the blood and tissues generally.

SOME FAMILIAR CLINICAL CASES ILLUSTRATING IMPORTANT ITEMS CONNECTED WITH THE ETIOLOGY, PATHOLOGY, AND THERAPEUTICS OF DISORDERED DIGESTION AND ASSIMILATION.

BY N. S. DAVIS, M.D., LL.D.,

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GENTLEMEN,—I have chosen the three following cases for consideration at this time, not on account of their rarity, but, contrariwise, because they will illustrate some of the most common and troublesome questions relating to the causes, pathology, and treatment of a class of cases which from their very frequency are apt to receive only superficial or routine attention by a majority of practitioners.

CASE I.—Mr. M., aged forty-seven years; resident in Michigan; occupation, hotel- and bar-keeper for many years; medium height and naturally well proportioned, but at present so loaded with fatty tissue that he weighs two hundred and thirty pounds. During the last fifteen years he has taken but little active out-door exercise; has enjoyed a fair appetite, and has drunk beer and some whiskey almost every day, though at no time sufficient to produce intoxication. During these years he has constantly increased in weight from increase of fatty tissue generally, and in the abdomen and chest especially; and in the same ratio has his ability to endure active muscular exercise diminished, as indicated by shortness of breath and rapid pulse on walking fast or going up-stairs. During the last year or more he has had a steadily-increasing disorder of digestion, as indicated by undue fulness of the stomach after eating, followed by abundant gaseous eructations and sometimes acid, with burning sensations in the epigastrium and chest, and occasional dizziness or vertigo. Four weeks since, during one of

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the very warm days in the latter part of July, he was rather suddenly attacked with very severe pain in the right frontal region above the eyebrow, accompanied by extreme vertigo, noise in his head, numbness of his extremities, and vomiting, with double vision, copious sweating, and much thirst, with great sense of weakness.

After the first few hours his vomiting ceased and the pain in his head became less, but all the other symptoms have continued until the present time. His expression of countenance is dull, with some œdema of the lower eyelids; pupils rather large, but responsive to variations of light; his skin is cool and wet with perspiration; pulse small, weak, and unsteady, varying from 100 to 120 per minute, with cardiac impulse weak. His respirations are 25 per minute, shallow, becoming panting when attempting exercise, with increased confusion of vision and buzzing in his ears. His urine is less than natural, but contains neither albumen nor sugar.

Such are the chief items in the history of this case and the important symptoms still characterizing it. Of the treatment to which he has been subjected during the four weeks since his more violent symptoms commenced we have no account, except that the patient says his bowels have been moved each day, and at one time his physician attempted to bleed him from a vein in his arm, but succeeded in obtaining only three or four ounces of blood. To gain rational and definite indications for the treatment of this case, we must first appreciate correctly the nature and extent of the pathological conditions on which his gastric, cerebral, vaso-motor, and cardiac symptoms depend.

To understand correctly the nature of the more important pathological conditions involved, we must keep in mind the three important etiological influences to which he has been exposed, and their influence on the functions and structures of the human system. These three etiological factors are in-door or sedentary occupation, deficient muscular exercise, and the daily moderate use of alcohol, chiefly in the form of beer and some whiskey, all operating persistently through a period of fifteen or twenty years.

Twenty years since our patient was a vigorous, healthy young man, probably weighing one hundred and fifty pounds, and capable of taking any reasonable amount of active physical exercise. Now, he says, his weight is two hundred and thirty pounds, and before the severe attack of alarming symptoms, four weeks since, he could not walk briskly twenty rods, or go up a flight of stairs at an ordinary pace, without shortness of breath and rapidity of cardiac action, and now even walking across the room causes cardiac and respiratory disturbance, vertigo,

and a sense of exhaustion. In what way has so great a change in the physical condition of our patient been induced? I answer, by the daily reception and distribution through the system of *less oxygen* from the pulmonary air-vesicles than was required to maintain natural nerve-sensibility and active metabolic changes throughout the whole system. By a quiet in-door life and little muscular exercise he has used daily several cubic feet less of atmospheric air in his lungs, and consequently the blood has taken up and carried to the tissues correspondingly less oxygen. In addition, the constant presence of some alcohol from the daily use of beer or whiskey has materially lessened the affinity of the hæmoglobin and serum of the blood for oxygen, and thereby still further limited the amount received for internal distribution, while the direct anæsthetic effect of the alcohol on the nerve-cells of the brain and medulla oblongata has exerted a constantly depressing influence on the respiratory, vaso-motor, and cardiac functions. By thus restricting the amount of oxygen received into the blood, the carbonaceous products, whether derived from food- or tissue-changes, have not been fully oxidized and eliminated, but instead have accumulated in the form of fatty tissue, adding seventy-five or eighty pounds to his body weight, while his nervous and muscular structures have suffered gradual impairment until the vaso-motor, respiratory, cardiac, and secretory functions are performed so imperfectly that he is not capable of longer enduring any active exercise or digesting ordinary food. The patient, having suffered all these changes and impairments, was subjected, four weeks since, to the additional vaso-motor depression of several unusually hot summer days, during one of which the circulation in the right anterior lobe and base of the brain was so retarded as to cause severe frontal pain, vertigo, dimness of vision, general numbness, and all the other symptoms hitherto described. The actual pathological conditions of the patient, then, are excessive fatty nutrition extending in some degree to the liver, muscular structure of the heart, and cerebral vessels; decided impairment of the vaso-motor, cardiac, and respiratory nerves; persistent congestion of the gastric mucous membrane, and impairment of the red corpuscles and oxygen-distributing power of the blood, to all of which has recently been added serious congestion of the right anterior portion of the brain, with some serous exudation, or possibly some degree of embolism. With such pathological conditions, induced by the long-continued action of certain causes already named, the prognosis cannot be regarded as altogether favorable. And yet by persistent avoidance of the chief causes of his present conditions, and the judicious use of such hygienic and remedial

agents as will increase vaso-motor and cardiac nerve-force, improve gastric and duodenal digestion, and restore a more perfect condition of the corpuscular elements of the blood, there would be a reasonable prospect of recovery. Such recovery would necessarily be slow, and relapses or renewed cardiac and cerebral failures might be produced by comparatively slight causes. In giving details for his hygienic treatment we must insist on his absolute avoidance of the use of all alcoholic liquids, including every variety of beer, ale, wine, whiskey, brandy, rum, and gin; for if modern experimental therapeutic investigators have demonstrated anything, it is that alcohol and all the well-known anæsthetics directly impair the integrity and functions of the hæmoglobin and corpuscular elements of the blood, and depress or paralyze the respiratory, cardiac, and vaso-motor nerves in direct proportion to the quantity taken.

His diet should be of the most simple and digestible quality, and taken in only moderate quantity. Good milk, light, well-baked bread, oatmeal, picked-up codfish and toast, and plain meat-broths seasoned with salt only, constitute the best items of food until the functions of the stomach are improved, when tenderly-cooked meats and vegetables may be taken cautiously. He should take passive exercise by riding in the open air every day, and practise taking full inspirations frequently, to encourage the reception and internal distribution of more oxygen. Each time on returning from the out-door exercise he should rest an hour in the recumbent position, and not attempt active walking or much muscular exertion until his strength is much improved. To aid in restoring a better tone to his vaso-motor and respiratory nerve-functions and improve both the quality of his blood and digestion of his food, I will give him the two following prescriptions:

		Grammes.	
℞ Chlorid. gold and sodium	0	25	= grs. iv ;
Ext. hyoscyamus	4	00	= ʒi ;
" scutellaria	4	00	= ʒi ;
" hydrastis	4	00	= ʒi ;
" nux vom.	1	33	= grs. xx ;
Mass. hydrarg.	1	33	= grs. xx.

Mix, divide into sixty gelatin capsules, and take one capsule before each meal-time and at bedtime.

		Grammes.	
℞ Fl. ext. pulsatilla	82	00	= ʒi ;
" " cactus grand.	20	00	= ʒv.

Mix, and take fifteen drops after each meal-time.

Four or five weeks since another man called upon me, giving a history in reference to habits of life, progressive perversion of nutrition, and

existing symptoms very closely parallel to the case before us. He had not had any sudden attack of pain in the head, as in this case, but his cardiac and vaso-motor actions were weaker, his feet and ankles more œdematous, and his breathing less efficient. He was placed at once under substantially the same restrictions and directions regarding diet, drinks, exercise, and medicines as I have directed for this patient. When I saw him last, two days since, he had adhered faithfully to the directions given him, and during the four preceding weeks had lost twenty-five pounds in weight, lost all appearance of œdema in both face and ankles, measured over three inches less around the body just above the umbilicus, and had been walking at a moderate pace half a mile with but little disturbance of either respiration or circulation. He was feeling very much improved in all respects, but examination still showed decided weakness and unsteadiness in the cardiac systole, which can be fully corrected only by renewed normal nutrition of the cardiac muscles through a period of six or twelve months.

The next case to which I will direct attention presents some features in strong contrast with the foregoing.

CASE II.—Mrs. B., aged twenty-five years, married, and nursing a child nine months old. She presents a decided nervous temperament, is thin in flesh, weighing at present only ninety-four pounds, though her normal weight is one hundred and twenty pounds. The pulse and temperature are natural, has no cough and no physical signs of cardiac or pulmonary disease; her appetite is fair, but suffers much during digestion from what she calls "heart-burn" and acid eructations; and once or twice each week she has severe paroxysms of pain from the lower point of the sternum through to the back, accompanied by nausea and retching, but no free vomiting. Her bowels are habitually costive, but the urinary secretion is nearly natural in quantity and quality. Soon after her confinement, the flow of milk in her breasts being less than usual, she says her physician advised her to drink some beer. Accordingly, she commenced taking a glass of beer at her meals and a bottle at night, and has continued doing so up to the present time, with the results stated above. Since she began to suffer from the paroxysms of violent pain in the epigastrium she has taken gin or some other strong liquor to relieve the pain. But her paroxysms have been steadily increasing in frequency, and she complains of constant weariness and great loss of strength. The flow of milk in her breasts has also diminished to such a degree that she does not have half enough for her baby. Yet she says the *beer* makes her feel better after each drink, and that the *gin* helps to relieve the severe attacks of

pain, and consequently she thinks she could not do without them. It is undoubtedly true that the patient feels temporary relief from the anæsthetic effect of the alcohol in her beer and gin, just as she would from any anæsthetic or narcotic. And it is equally true that so long as the alcohol is present in her blood it so modifies the hæmoglobin and albuminous constituents as to diminish the reception and internal distribution of oxygen, and thereby retards metabolic changes, as already mentioned in connection with Case I. But in this case, instead of retaining a fair degree of gastric digestion and accumulating fatty tissue, as in the first case, the combined influence of the alcohol in retarding the internal distribution of oxygen and the drain upon the nutritive elements of her blood in furnishing milk for her baby, led to rapid impoverishment of the blood and tissues, and the early establishment of a sufficient grade of gastritis to cause indigestion, frequent vomiting, and, later, paroxysms of severe gastralgia, with general emaciation and loss of strength.

In accordance with the present popular ideas both in and out of the profession, this patient tells me she has tried a great variety of foods, peptonized, sterilized, and predigested, but all to no purpose. And why? Simply because her troubles are not in the kind of food she takes, but in the morbid condition of her blood, and of the mucous membrane and nerves of her stomach. Consequently the rational indications for her *treatment* are (*a*) to get her stomach and blood free from the alcohol of beer and gin; (*b*) to encourage the reception and internal distribution of oxygen by plenty of fresh air; (*c*) to give her the most bland or unirritating food in small and frequently-repeated doses, of which good milk with lime-water and milk and wheat-flour gruel are the best; (*d*) such medicines as possess sufficient antiseptic and anodyne properties to allay the irritability of the gastric mucous membrane and lessen fermentation. For this purpose I have often obtained excellent results from the use of the following prescription:

		Grammes.	
℞	Acid. carbolic.	1	00 = grs. xv ;
	Glycerin.	20	00 = ℥iv ;
	Fl. ext. cactus grand.	25	00 = ℥vi ;
	Tinct. opii camph.	60	00 = ℥ii ;
	Aquæ menth.	160	00 = ℥v.

Mix. Take four grammes (f℥i) just before each time of taking food, and at least every second day encourage the bowels to move by a full enema of warm water or by a glycerin suppository.

If the patient could be persuaded to adopt and patiently pursue such a course of diet, fresh air, and mild medication with entire absti-

nence from alcoholic liquids, both fermented and distilled, she would soon begin to improve, and in a few months regain fair health. But so completely deluded are such patients by the temporary anæsthetic effect of alcohol that they are apt to return to it on the first return of a paroxysm of pain, in opposition to all the advice and explanations that can be given them. If this patient persists in doing so, she will be likely to die from chronic gastritis and inanition before eighteen months have passed.

The third case to which I shall briefly direct attention will illustrate another form of mental delusion that frequently proves troublesome to both physician and patient.

CASE III.—Mr. D., aged about twenty-four years, medium size ; occupation, railroad switchman. His face is redder than natural, and expression dull ; pulse slightly increased in frequency but not in force ; temperature and respiration natural ; tongue coated, and he complains of dull pain in his head. He has gaseous eructations with fulness and some pain in the epigastric and left hypochondriac regions after taking food, and occasionally vomiting. The evacuations from the bowels are irregular, sometimes moving several times in one day, then not any for the next two days. His urine is natural in quantity, a little redder than normal, but is passed more frequently and with some burning in the urethra. He also frequently suffers from pains in his loins and lower extremities, with a sense of weakness and thirst.

Physical examination furnished no signs of disease in the chest except diminished cardiac impulse, and in the abdomen increased fulness and some tenderness in the epigastric and hypochondriac regions, apparently caused by gases in the stomach and intestines. He is unmarried, and says he has involuntary seminal discharges two or three times a month, and several years since practised self-abuse, to which he confidently attributes all his ill-health, and for the cure of which he has employed several " private-disease doctors." During the last five years he has used daily tobacco, beer, and whiskey, the latter sometimes to an extent sufficient to produce positive intoxication. A correct analysis of the symptoms above stated shows that the patient is suffering from decided impairment of the functions of the vaso-motor nervous system, as indicated by his flushed face, lessened cardiac impulse, and general sense of weakness ; from irritability and congestion of the gastric and duodenal mucous membranes, as indicated by epigastric distress, gaseous eructations, and sometimes vomiting ; and from simple irritability of the membrane lining the neck of the bladder and urethra, including the orifices of the prostatic and seminal ducts. All

of these are easily and rationally explained by his irregular life of exposure as a switchman, supplemented by the daily liberal use of tobacco, beer, and whiskey, without calling in the aid of an imaginary influence of self-abuse practised ten or twelve years since. And if he would at once and permanently stop his daily process of slow poisoning by nicotine and alcohol, live on plain food, take for two or three weeks the same medicine I recommended for Case II., and let his sexual organ alone, he would soon recover a fair condition of health.

THE TREATMENT OF HEART-DISEASE.

CLINICAL LECTURE DELIVERED AT GUY'S HOSPITAL.

BY FREDERICK TAYLOR, M.D., F.R.C.P.,

Physician to and Lecturer on Medicine at Guy's Hospital.

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GENTLEMEN,—This woman, aged forty-one, was admitted to the hospital on October 27, in an advanced stage of cardiac disease. She had already been in the hospital six times previously, first in 1883, when she had rheumatic fever, and again in 1888, 1889, and 1893. On each occasion a presystolic mitral murmur was heard, and at the last admission she had also a tricuspid murmur and a large pulsating liver. She was again in the hospital two months ago; but, in addition, she has for some years frequently had to rest in bed for a few days on account of dyspnœa. Since leaving the hospital last she has resumed her laborious work, but three weeks ago, after exposure to cold, she acquired fresh cough, her legs swelled, and she had to stop at home. She has become rapidly worse the last few days. On admission she was extremely ill, with urgent dyspnœa and orthopnœa, cyanosis, a small rapid pulse of 140, and respirations of 48 to the minute. Twenty minutes after being in bed the breathing became still more labored, her lips were almost black, she was throwing her arms about restlessly, gasping for air, with all the extraordinary muscles of respiration in violent action. I ordered immediate venesection, twenty minims of the tincture of digitalis at once, a hypodermic injection of brandy, and inhalations of oxygen. She was bled to ten ounces from the right cephalic vein, and relief was quickly afforded, so that three or four hours later the pulse had fallen from 150 to 136, the respiration from 50 to 40.

It is not my purpose to go into any full detail as to the exact condition of her heart. Suffice it to say, that, when she was well enough for an examination to be fully carried out, the following was found: characteristic appearance of mitral stenosis, with congested cheeks; clubbed finger-ends; œdema of the feet and ankles; cardiac impulse in

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the fifth interspace, just outside the nipple, with marked epigastric pulsation; a long typical presystolic murmur at the apex with accentuated first sound; a high-pitched tricuspid systolic murmur over the ensiform cartilage; sibilant rhonchi and râles on both sides of the chest; at both bases dulness with absence of breath-sounds and of tactile vocal fremitus; liver extending three fingers' breadths below the ribs.

Fifteen minims of the tincture of digitalis in half an ounce of water were given two hours later, and the same was repeated every four hours. In the evening the pulse was 120, the respirations 36. On the following day (28th) there was a further fall to 100 and 30 respectively, and on the 29th the pulse was 80. The digitalis was reduced to a ten-minim dose every two hours; the ankles were no longer œdematous, the urine was of paler color and free from albumen, and the dulness at the bases of the lungs was less extensive.

From this time she rapidly improved, the pulse fell to 65, and the tricuspid murmur disappeared, but the presystolic remained unaltered.

Gentlemen, I do not propose to discuss every question involved in the above case, but only that of its treatment. It was a case of advanced valvular disease of the heart admitted to the hospital in a very critical condition. She was bled from the arm, digitalis was given in full doses, and improvement followed with satisfactory promptness.

Cases of this kind are among the commonest with which we have to deal. Mitral constriction of long standing has strained the heart almost to its utmost. Compensation can be fairly well maintained when the patient is at rest, but when she is compelled, as is often the case, to work for her living, or to look after all the wants of a large family and a wage-earning husband, the additional stress upon the heart soon reduces its compensation to a vanishing point, backward pressure is exerted upon the lungs and right ventricle, tricuspid regurgitation takes place, and there are found the familiar venous distention, dropsy, ascites, enlarged and perhaps pulsating liver, and albuminous urine. The action of the heart is rapid, feeble, and irregular, and the same characters are shown in the well-known " mitral pulse." Bad as the condition may be, we know that escape from it is quite possible in a great many instances; and indeed many patients have been almost at death's door five or six times before they ultimately succumb. What is the line of treatment we should adopt, and what are the principles which should guide us? There are three methods of dealing with the heart, all of which may be employed at the same time. They are (1) rest, (2) depletion, and (3) the use of certain drugs usually known as cardiac tonics. The first and second of these are

used to diminish the amount of work thrown upon the heart, the third to strengthen the heart and make it more fit to cope with what it has to do.

Rest.—This is the most important factor in cases of heart-disease. It is absolutely necessary in the most severe stages : I mean the patients cannot do anything but rest, as syncope would almost certainly follow any attempt to get about. But even in earlier stages the effect of the drugs classed under the third head is reduced to a minimum or entirely annulled by a refusal on the part of the patient to see, or by the omission of the doctor to remember that the work of the heart is very different indeed in one lying in bed and in one actively engaged in his daily occupation. Many a patient wants to be cured by one or two bottles of medicine procured as he goes up to the city, and the medical man must see that his own reputation is not damaged by attempting to do too much with drugs, and too little by the simple aid of physiological mechanics. There are, it is true, cases in which the heart is so sensitive to the action of digitalis and allied drugs that a few doses will have a striking effect, and rest hardly seems demanded. There are others and many more, on the contrary, where these drugs appear utterly useless, and improvement is only very slowly and gradually obtained after a prolonged rest of weeks or months.

By the second means, depletion, we try to reduce the quantity of blood that streams into the heart by the right auricle and has to be by it driven through the lungs, and subsequently by the left ventricle distributed to the body. This depletion may be carried out by venesection, or by increasing the secretion of the skin, the bowels, and the kidneys. Venesection is required only in urgent cases, but it may be the direct means of saving life when the right ventricle is so gorged with venous blood that its contraction is impeded and cessation of the heart's action is threatened. It seemed to me expedient and necessary in this case, and I have no doubt the removal of the blood from the vein contributed to the patient's improvement. The other methods of depletion are the use of purgatives by which the watery secretions of the bowels are increased, and the use of diuretics, such as squills, nitrous ether, acetate and citrate of potassium, by which the urine may become abundant.

We come now to the third line of treatment, the use of so-called cardiac tonics. Those in more common use are digitalis, strophanthus, citrate of caffeine, strychnine, and convallaria majalis. Of these I think there can be no doubt that the most trustworthy and most efficient is digitalis, and certainly it is the one in which I have most confidence.

Now, a point about digitalis that I want to bring to your attention especially is the necessity of knowing how much digitalis you may give in the kind of case which I have taken in to-day's lecture. Now, of course, you must not overdose your patient, but, on the other hand, you must not be afraid of giving enough in cases where the symptoms are critical and relief is urgently called for. My experience is that it is no uncommon thing for those who are recently qualified, and for some even who have been in practice many years, to give doses of digitalis which fall short of what is not only justifiable but necessary.

The case I have recorded was one in which the effect of digitalis, or indeed of the other drugs if they had been used, was most likely to be realized. The case was one of mitral disease with tricuspid regurgitation, and the action of the heart was quick, feeble, and irregular. It is, as we know, especially this action which digitalis corrects by rendering the beat of the heart slower, prolonging the diastole, strengthening the systole, and diminishing or altogether abolishing its irregularity.

What is the dose which will effect this?

I often find that ten minims of the tincture are given every four hours. No doubt in time this dose, combined with the rest, and assisted by diuretics and purgatives, will give relief; but I have often seen a patient under such a dose pass twenty-four or forty-eight hours with no material improvement; and if there is no gain in the course of twenty-four hours with such symptoms, you are justified in giving more. In fact, I never begin in such a case with less than fifteen minims every four hours,—that is, a drachm and a half in the twenty-four hours. In the present case a single dose of twenty minims was given at once, and it was followed by the order of fifteen minims every four hours. Had not improvement soon set in, I should have increased the dose to fifteen minims every three hours, or twenty every four hours. These doses must be watched. The object is to get a rapid effect upon the heart, and then withdraw as much of the drug as is not required. It will very probably be found that after two days of the full doses the pulse has been brought down to ninety or eighty per minute, and then the drug can be continued to the extent of one drachm in the day in divided doses, and later on even less. It is not to be forgotten that if you are a long distance from your patient you may feel a certain degree of hesitation in prescribing a dose which requires to be carefully watched. In that case you must either give the large dose and sacrifice yourself and your time in the necessary visits,

or you must give the smaller dose, and the patient must suffer a little longer than she otherwise would need. But of this I am certain, that in the majority of cases your patients will thank you to show a reasonable amount of vigor in the use of digitalis and of the allied drugs under the particular circumstances we are dealing with.

Now, I have implied that in giving these doses we are working somewhat near the edge of a cliff, and that, if the dose is continued too long accidents are likely to happen. What are they? There are certain symptoms which are generally seen when patients are taking a little more digitalis than they can bear. They suffer from vomiting and headache, and the pulse becomes very slow, but at the same time is irregular. Sometimes the pulse beats in couples, the so-called *pulsus bigeminus*. These symptoms will be stopped at once by the withdrawal of the medicine or the considerable reduction of the dose, and I do not think you need fear other or more serious results.

It is quite doubtful if digitalis, taken in genuine medicinal doses, such as these I have mentioned, can produce fatal results, as, for instance, by sudden death or cardiac syncope. There still lingers in one's mind the idea of the cumulative effect of digitalis, the old meaning of which seemed to be that a patient might take harmless doses of the drug for several days or weeks, and that then a toxic effect would manifest itself by sudden death. All drugs have a cumulative action in one sense,—that is, that if at regular intervals a quantity is given, greater than can be eliminated in the interval, the excess will in time be sufficient to cause toxic symptoms. But this is as true of bread and butter as it is of most drugs. Digitalis does, indeed, differ from some other drugs in that, by its action upon the circulation through the kidneys, it increases the difficulties in the way of its own elimination, so that after a certain number of doses the interval may not be long enough for complete elimination, and so toxic effects may result, just as if the dose had been originally too large for the interval in which it was given. This is a good reason for carefully watching the effect when the larger doses are given; but it is not likely to bring about catastrophes after many weeks' use of the drugs, and it remains a fact that in small quantities of half a drachm or forty minims *per diem*, digitalis may be taken for weeks without any difficulty.

Strophanthus is another drug which has an action very similar to that of digitalis, but is regarded by some as of greater advantage, because it does not increase arterial tension by vaso-motor action. But it is no more uniformly successful than digitalis, it equally causes sickness in some cases, and, on the whole, it is not more to be relied upon.

You should, however, undoubtedly try it if digitalis fails, and it sometimes succeeds in such a case. I am inclined to believe that the success of strophanthus after the failure of digitalis may sometimes have been due to the former drug being given in a proportionately larger dose. Weight for weight, strophanthus is a more powerful drug than digitalis. The pharmacopœial strength of the tincture of digitalis is one in eight. One of the first tinctures of strophanthus in use, before it was officinal, had a strength of one in ten, and it was found to be inconveniently strong, so that it was reduced to one in twenty, the strength of the present pharmacopœial tincture. Five minims of this tincture is the dose usually given, which may be as effective as a ten- or fifteen-minim dose of tincture of digitalis in a suitable case.

All that I have seen and heard of the other remedies of this kind which I have named is to the effect that their action is similar to but not as powerful and certain as that of digitalis or strophanthus.

There are some other points about these drugs of considerable interest. One is the action of digitalis in aortic regurgitation. Different opinions have been expressed with regard to it. Two objections have been raised to it,—one that, since in so many cases aortic disease is accompanied by hypertrophy of the left ventricle, the overaction of the ventricle is likely to be aggravated by digitalis; another, more serious, objection is that, since digitalis prolongs the diastolic interval and regurgitation takes place during that interval, the amount of blood falling back from the aorta would be greater at each beat of the heart, and as a result there would be a greater tendency to cardiac dilatation, and a greater probability of syncope from diminution of the supply of blood to the brain. Now, I rather doubt if this is a valid objection, because one admitted action of digitalis is to increase the force of the heart's contraction, and the activity of the cerebral circulation thus brought about would easily compensate for the diminution resulting from a freer regurgitation. What seems to me the main objection to digitalis in aortic disease, as such, is not so much that it does harm, as that it does but little good. The kind of cardiac action in which digitalis is of so much value—that is, the rapid, feeble, and irregular action of mitral disease—is not usually present in uncomplicated aortic disease, in which, on the other hand, the heart tends to beat regularly, with some degree of rapidity and with distressing force. Later, when the aortic trouble is complicated by mitral regurgitation and the action becomes irregular, digitalis may be given with advantage. Even apart from secondary mitral failure, if the action of

the ventricle is feeble and suggestive of dilatation rather than of hypertrophy, digitalis may fairly be tried in moderate doses.

But even in cases of mitral disease, in which the action of the heart seems to be of the kind which can be relieved by this drug, difficulties will sometimes arise. I have already pointed out the value of other drugs having an eliminative or depletory action, such as diuretics and purgatives, and it is my common practice to combine the digitalis with such diuretics as acetate of potash and squills. A very useful mixture, known here as the mistura potassii acetatis composita, or diuretic mixture, contains in a dose twenty grains of acetate of potash, fifteen minims of tincture of squills, thirty of the spirit of nitrous ether, and one drachm of succus scoparii. I often add to this the dose of tincture of digitalis, and give it every three, four, or six hours, according to the state of the patient.

In other cases, where the cardiac failure is very pronounced, and a decided effect upon the heart is required, the digitalis in full dose may be given with carbonate of ammonia in five-grain doses every two or three hours until the pulse is fuller and steadier. Without reaching the full development of toxic symptoms mentioned above, this treatment may fail, either on account of sickness or on account of rapid fall of the pulse with distressing action of the heart. The medicine may be stopped in either case, but then the pulse quickens again, and the patient is as he was before. For the sickness I have often found it successful to give the digitalis with water alone, excluding all the other saline or vegetable diuretics, and being content to consider the action of the heart alone.

For the perverse action of digitalis, in which it appears to overact at once in moderate doses, and to do no good in smaller quantities, I have often tried, and sometimes with success, the addition of tincture of belladonna. It suggested itself to me, on rather crude physiological principles, to try and neutralize the excessive slowing action of digitalis by the quickening action of another drug.

But whatever combinations of drugs you may find it expedient to try, never forget the paramount importance of rest, physical and mental, to the patient with pronounced valvular disease. It is astounding what patients will expect and demand from a bottle of medicine, and how they will do almost anything rather than suffer the supposed " weakening" effect of three or four weeks in bed ; but it is both unscientific and impolitic to allow your patients to believe that salvation lies only in drugs, and not as well in every other means by which the action of our vital organs can be effectually maintained.

THE FILARIA SANGUINIS HOMINIS AND FILARIA DIURNA.

CLINICAL LECTURE DELIVERED AT UNIVERSITY COLLEGE, LONDON.

BY PATRICK MANSON, M.D., C.M.

THE FILARIA NOCTURNA.

GENTLEMEN,—The filariæ of the blood are very widely spread in a geographical sense, and in their special endemic areas affect a very large proportion of the inhabitants. Although the filaria nocturna does not often kill directly, it not infrequently does kill indirectly; certainly, in the aggregate, it gives rise to a vast amount of suffering, of invaliding, and of hideous physical deformity. From a biological point of view there are few organisms with so interesting a life-history; there is none, so far as we yet know, which plays so strange a pathological part.

My remarks will apply solely to the filaria nocturna, formerly known as the filaria sanguinis hominis. There are at least three other filariæ sanguinis hominis, perhaps even more. I shall ask you, in the first place, to visit with me in imagination one of the great native hospitals in some such place as Rio or Bahia in the Brazils, or Madras in India, or a more modest establishment of which I had medical charge at one time, the native hospital in Amoy, China. I shall ask you to make our visit about nine in the evening, and to bring with you a packet of labelled microscope slides. Our purpose is to sample the blood of the natives. We select a hospital, as it is convenient for such a purpose; but a jail or any similar place, where we could have ready access to large numbers of people, would do equally well. We take the first patient we come to in the wards. We wind a string round the distal phalanx of one of his fingers, not too tightly, and with a clean needle prick the congested finger-tip. The drop of blood which wells up we transfer to one of the microscope slides by dabbing the glass on the blood. We then spread the blood out carefully with the needle in a fairly uniform layer about an inch in length and

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breadth ; we write the name and number of the patient on the label for purposes of identification, lay the slide on its back, and cover it up from the dust. We then proceed to the next patient and do the same with him, and so on round the wards, sampling the blood of each patient, irrespective of the disease he is suffering from, and until we have got blood-slides from say fifty individuals. No cover-glass being used, the blood dries very quickly. We shall take the slides home with us and examine them at our leisure, either at once or, if more convenient, on our return to England. They will not spoil if kept from the damp. Suppose we proceed with their examination at once. To do this it is necessary for the purpose in hand to stain the slides in a particular way. Prepare a weak solution of fuchsine, one or two drops of the saturated alcoholic solution to the ounce of water. Plunge the slides in this and keep them immersed for an hour or so. As we are examining a large number of slides, to economize time and material we stain twenty-five at a time. On removing one of the slides from the fuchsine bath, should it appear too deeply stained, wash it for a few seconds in dilute acetic acid, two or three drops to the ounce of water, taking care to wash away the acid with fresh water before proceeding with the microscopic examination. If not too deeply stained, it is not necessary to decolorize with acid. Examine the slides while they are wet and without a cover-glass. The microscope is better if provided with a mechanical stage having parallel move-ments. Use a nose-piece carrying at least two objectives, one of which—the searcher—magnifies sixty or seventy diameters, and the other two hundred or three hundred diameters. Place one of the slides under the searcher, and, beginning at one end, pass the whole film of blood in review, bit by bit. In most of the slides you will see nothing to attract your attention. You will perceive that the white corpuscles are deeply stained by the dye, and that nearly all the color has been washed out of the red corpuscles. You will come across little bits of dust, shreds of cotton, and other vegetable fibres which have fallen on the blood while it was drying, despite your pre-cautions. The nature of these, if at all doubtful, you will readily ascertain by centring them and turning on the higher power. The search may be long and a little tedious, but, if you persevere, sooner or later, perhaps in every eighth or tenth slide, perhaps more fre-quently, you will come across certain colored, convoluted objects, which at once arrest attention as being something quite different from any-thing you may have seen before. These colored bodies, though small, are distinct enough and sharp in outline. They may remind you of

the little flourishes with which, when a school-boy, you would some-times embellish your note-books. If you have the curiosity to count them, which you can easily and accurately do with the aid of the mechanical stage, you will find that, whilst in some of the slides con-taining them there may be thirty or forty of these bodies, in other slides there may be as many as five hundred or six hundred, sometimes five or six in every field. Turn on the higher power, and you will see that these colored dashes are resolved into long, snake-like bodies, their folds and outlines disposed in graceful sweeps and curves. You will perceive that, although no two are arranged in exactly the same way, yet each is like the other as regards size and shape. They are all rounded off somewhat abruptly at one end, tapered off and pointed at the other, a long, cylindrical body intervening, the whole resembling a miniature snake. This is the filaria nocturna.

FILARIAL PERIODICITY.

Your curiosity is aroused by the discovery you have made, and probably next day, soon after breakfast, you return to the hospital to continue your investigations. You at once proceed to the patients who supplied the filariæ the previous evening, and make a number of fresh preparations of the blood, which you stain and examine as before. But now you are astonished to discover that, instead of hundreds of filariæ, hunt as long as you like, you can find only one, or at most two or three, in a slide, very often none at all. You work on till four or five o'clock, but with no better success. You go home to dinner, return-ing to the hospital again in the evening; and now, in the very patients whose blood you had been examining so unsuccessfully all day, you once more find filariæ in the same profusion as on the previous evening. Sample and examine those patients' blood at intervals of an hour or two during the night. You will find that the little snake-like bodies increase in number till about midnight; then they begin to get fewer and fewer; by daybreak they are down to ten or twelve in a slide, and by breakfast-time they have again disappeared completely, or almost completely; and, though you keep your examinations up for a month or a year, or even ten years, and even if you bring a patient home to England with you, you will find that the same nightly appearance and daily disappearance goes on with the utmost regularity, provided the patient's habits and health are not seriously interfered with. But if, by way of experiment, you make him sleep during the day and keep awake at night, you will find that the filariæ will, under these circum-stances, come into the general circulation during the day and disappear

from it at night. This strange phenomenon is called "filarial periodicity," and it is owing to these nocturnal habits that, to distinguish it from the other filariæ which live in the blood of man, I have called this species filaria sanguinis hominis, or, briefly, filaria nocturna. It is important to bear this fact of filarial periodicity in mind, to enable us to search intelligently and successfully for filaria nocturna in patients, and also because, like every other feature, whether anatomical or physiological, connected with these or any other organisms, no matter how lowly, depend upon it, it is planned by nature in the interests of the organism, and will help us much, if properly regarded, in understanding its life history. We shall return to this by and by.

THE LIVING PARASITE.

The dried and stained preparations are of use only as enabling you rapidly to find the parasite for purposes of diagnosis and enumeration; they do not show well the structure of the filaria. Proceed now in this way. Take a small quantity of finger-tip blood up on a cover-glass and lay it on a slide, adjusting the amount of blood so that it shall be just sufficient to run out between the slide and cover-glass in a thin layer the thickness of the breadth of a corpuscle, but not so thin as to compress the filaria or to interfere with the corpuscles arranging themselves in rouleaux and standing on their edges. Better prepare half a dozen slides at an hour, 9 or 10 P.M. say, when you know the filariæ observed in the blood are abundant; and, as the examination has to extend over a week or longer, you had better seal the edges of the cover-glass with vaseline to prevent evaporation. Place such a slide under the low power and search. Presently you will bring into the field a minute, colorless, wriggling worm exhibiting a wonderful activity, knocking about the blood-cells right and left, and comporting itself generally very much like an eel on a hook. You will observe that although the movements of the creature are very active they do not lead to locomotion, the little worm remains always about the same spot on the field. Turn on now the high power. Your eye can hardly follow the movements. Wait a few hours or perhaps a day, or select a worm near the edge of the slide where the blood has dried up a little. You will then perceive that though the filaria is still alive its movements have slowed down sufficiently to enable you to make out some interesting anatomical details. You will notice (Fig. 1) that one end of the worm, as I have already said, is rounded off, and that the other end tapers to a fine point. The body is perfectly transparent and everywhere homogeneous except about the middle third, where, for a

short distance along the axis of the little animal, there seems to be a sort of faintly-marked granular aggregation (Fig. 1, *a*) which refracts the light somewhat differently from the rest of the animal. Fix now your attention on the head and tail. You will perceive, when it comes into exact focus, what appears to be a lash of extreme tenuity, now dangling from one end and following it—trailed after it as it were—in its movements, and now from the other, sometimes from both. This is about as much of the structure of the filaria as you can make out with a moderate magnifying power. Wait another day or two. The worm is still moving, but its movements are now much more languid. Probably it is lying in a lakelet of clear serum from which it has dashed aside the corpuscles, and we can have a clear and uninterrupted view of it. Now put on a high-power immersion lens and carefully adjust your illumination. You will probably perceive that the body of the little worm is marked everywhere with an exceedingly delicate and closely-set transverse striation. You will also make out that what under the lower part looked to be a lash at the head and tail is really the collapsed ends of an exceedingly delicate bag or sac which encloses the filaria and which is too long for it, so to speak (Fig. 1, *b*). You notice that the filaria can move backward and forward in the sac so that sometimes the tail end of the sac is occupied, sometimes the head end is occupied, and sometimes the filaria is about the middle of the sac (as in Fig. 1), redundant sheath dangling from both head and tail. It is as if the filaria were a short snake inside a longer snake's skin, the girth of the snakes being the same, however, as the sac is closely applied to the body of the worm, notwithstanding the redundancy at head and tail. If you scrutinize the head end very carefully you will see that it has a sort of pouting, dimpling, snapping movement; and, if you possess a good high-power lens, you will see that occasionally a minute spine (Fig. 2, *a*) is rapidly shot out from the extreme end and as rapidly retracted, like the tongue of a snake. Further, you will see that the pouting, snapping appearance is produced by the move-

Fig. 1.

The filaria sanguinis hominis. —*a*, the granular mass near the centre; *b*, the collapsed extremities of the delicate surrounding capsule; *c*, the V spot, probably connected with the development of an excretory organ or of future sexual organs.

ments of a sort of six-lipped hood or prepuce which is alternately
drawn back (Fig. 2, *b*) and projected (Fig. 2, *c*) over what I may desig-
nate the head of the worm. When strongly retracted you can perceive
that the lips of the prepuce are everted, so that they take the form of
claws or little hooks with the bite directed outward and a little back-
ward (Fig 2, *b*). Note these anatomical points carefully : the sac or
sheath enclosing the worm, the cephalic spine or tongue, the lipped and
hooked retractile prepuce. They have each of them important func-
tions to fulfil in the future life of the parasite. One other anatomical

Fig. 2.
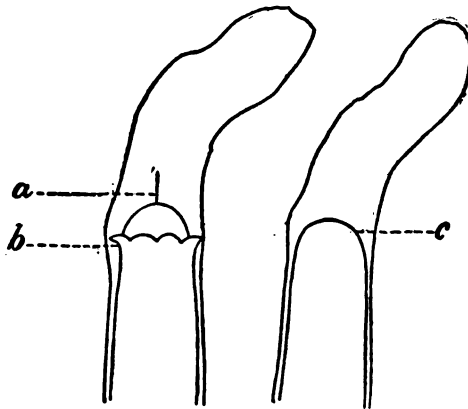
Enlarged head end of the filaria, showing the six-lipped hood which
is alternately drawn back and projected.—*a*, the cephalic spine; *b*, the
lipped prepuce; *c*, the head of the worm.

point I may mention, although I cannot pretend to interpret it with
certainty. A short distance behind the head—about the four-hun-
dredth of an inch or so—you will sometimes see a minute luminous
patch shaped like the letter V, the apex of the V being at the periphery
of the worm. This I call the V spot (Fig. 1, *c*). I believe it is con-
nected with the development of the excretory or of future sexual
organs ; but more than this I would not venture to suggest. I do
not think much more can be made out by a microscopic study of the
filaria. It will continue to live in a languid way for many days pro-
vided the slide is not allowed to become dry. I have kept them alive
for a fortnight. When they die you can easily measure them. You
will find that they are about $\frac{1}{70}$ to $\frac{1}{80}$ of an inch in length by about
$\frac{1}{3600}$ of an inch in thickness, or about the breadth of an average red
blood-corpuscle.

You will observe that there is no indication of efficient reproduc-

tive organs in the filaria, nor any other arrangement by which the creature might multiply. Nor is there any evidence that it increases in size or alters in structure while in the circulation. The filariæ are in fact all very much alike in appearance, and the morning filariæ are no larger than the evening filariæ. Therefore, we are justified in inferring that the little animal we see in the blood is an immature organism, a sort of embryo. In other animals besides man similar embryonic hæmatozoa are not uncommon; and when such animals are dissected the mature parasite, from which the embryonic hæmatozoa proceed, is frequently encountered. These mature filariæ are of considerable size, and are usually found in the heart or blood-vessels, more especially in the venous system. They are male and female, the sexes living together. They have elaborate alimentary and reproductive organs, and from the latter embryos, identical in size and shape with those circulating in the blood, can be seen to emerge. The best known of these mature blood-worms is a large hæmatode common in the heart of dogs in certain countries, and called filaria immitis. These canine hæmatozoa live free in the right side of the heart and in the associated vessels, and measure when stretched out from eight to fourteen inches in length by about one-tenth of an inch in thickness. Similar, though smaller, parasites are very common in birds. Now, if you dissect these mature filariæ you will find that the uterus of the female worm is stuffed with embryos exactly like those we can see free in the blood; and in the more delicate and smaller species of hæmatozoa, such as those inhabiting the vessels of birds, in which the tissues are very transparent, we can actually see the embryos forced out through the vagina of the worm by the contractions of its uterus. These embryos are manifestly of the same nature as the human blood-worm, though of course belonging to a different species. We are justified, therefore, in inferring that there are similar parental forms in the bodies of infected human beings, and that they give birth to the embryo worms we find in the blood, and such parental forms have actually been found in a good many cases, at least seven or eight times. I have encountered them twice. These mature worms—they are called filaria Bancrofti—are some three or four inches in length and about the thickness of a stout horse-hair. They are male and female, the latter being the larger. It is fairly certain that of these mature filariæ the habitats are the lymphatic vessels, often, apparently, the thoracic duct and larger lymphatic trunks. Lying then in the lymphatic system somewhere, male and female, sometimes several males and females together, they discharge their young into the lymph stream. By the lymph they are

carried—even through the glands, if such intervene—into the general circulation. Should the embryos arrive in the blood during the day they are quickly filtered out by some mechanism which we do not as yet understand and the seat of which is not yet known. In the filtering organ or tissue the embryos remain until evening, when they are liberated and permitted to circulate until next morning, when they are again detained. The cause of this singular filarial periodicity, I told you, is not understood; the meaning of it I shall presently explain.

You will ask, What becomes of the embryos in the long run; how do they leave the body and pass from one man to another, as they must do if the species is to be continued? Most animal parasites have to quit the body of the original host before they can attain maturity. If they did not quit the body of the host but began to grow in it they would soon overwhelm the host, kill him, and at the same time themselves, and the species would be speedily exterminated.

The filaria is enclosed in a sac which, while in the human heart, it is powerless to quit. Although provided with the formidable oral armature, it cannot use it; for if it try to force its way through the sac, this being in a very fluid medium, the living blood, it has no purchase, so to speak,—no means of fixing the sac so as to get a good blow at it. Any force it may apply carries the sac before it, as it were. It is, in fact, muzzled. You are also aware that the filariæ circulate only during the night; they approach the surface of the body at this time, and at this time only. This is another circumstance to be borne in mind in trying to get at the future history of the filaria. A third fact will also assist us; the parasite is limited, as regards its geographical distribution, to the warm regions of the globe.

THE FILARIA AND THE MOSQUITO.

Now let us try to reason on these data. The embryo is powerless to effect its own escape from the body of man; some extraneous agent must, therefore, intervene and effect this for it. The parasite approaches the surface of the body only during the night; therefore this agent must operate during the night, and be of nocturnal habits. As the parasite is confined in its geographical distribution to the warmer regions of the globe, it is to be presumed that the liberating agent we are in search of must have a similar geographical distribution. What agent conforms to these three conditions? Is there anything which is confined to the warm regions of the earth which is nocturnal in its habits, and which could pick the helpless filaria out of the cutaneous circulation. Many years ago I put these questions to myself, and I

came to the conclusion that the only agent conforming to these three conditions is the mosquito. The mosquito is a blood-sucker; it feeds by night; certain species are confined to warm countries. I made many experiments and observations on the point, and found that my conjecture was absolutely correct. I shall ask you to again come with me to the tropics. We shall suppose that we are quietly seated in our study; that the sun has just gone down, and that darkness is coming on. If you keep very still and listen attentively you will hear a peculiar, high-pitched, humming noise coming from about the region of the ceiling. This noise is produced by the vibration of the wings of the mosquitoes, which at that hour begin to come out. I think that at this time, and when the insects are wheeling about high up in the air, the sexes come together and impregnation is effected. As the light wanes the humming noise ceases, and we become unpleasantly conscious that the cause of it has descended to our own level. Presently a mosquito may settle on the back of your hand as it lies on your knee. Make yourself a martyr to science; don't disturb the insect. Watch it. The long proboscis is dug into your skin, and the abdomen rapidly becomes distended with your blood. In a minute or two, when its belly can hold no more, the insect withdraws its proboscis and flies away. Follow it, and you will find that it seeks out and settles in some dark, windless spot, near water if it can discover such a place. There, if not disturbed, it will cling for five or six days. During this time it is digesting its meal of blood, and at the same time maturing its ova. In due course, these operations being completed, the insect will quit her shelter, and alighting on the surface of the water will deposit her ova. Then she dies, very likely on the water and in the vicinity of her little boat-shaped cluster of eggs. Observe that it is only the female mosquito that drinks your blood; the male is not a blood-sucker. The structure of his proboscis is different from that of the female, and prevents him from penetrating the hard skin. This, too, is a significant fact in view of the life history of the filaria.

Suppose we persuade, for a consideration, a complacent native, in whose blood we have ascertained the presence of the filaria, to submit to be bitten by mosquitoes. We collect the blood-charged mosquitoes after their meal, place them in small colored bottles, and dissect them one by one at intervals during the five or six days intervening before they are ready to deposit their eggs.

We begin with an insect which has just fed. We tear the abdomen from the thorax and express on a glass slide the blood the abdomen contains; we cover it with a cover-glass and place it under the microscope. We at once perceive that the expressed blood contains hundreds

of actively wriggling filariæ,—usually many more than a similar quan-
tity of blood obtained from the finger by pricking it in the ordinary
way does. The individual filariæ are in every respect like the filariæ
drawn directly from the man's finger. Two or three hours later we
sacrifice another of our mosquitoes, and examine the blood in its
abdomen in the same way. We now remark that certain changes have
taken place both in the blood and in the filariæ. The blood has
become more viscid, the corpuscles are no longer distinctly defined, and
their hæmoglobin has escaped into the plasma. The filariæ are mani-

FIG. 3.
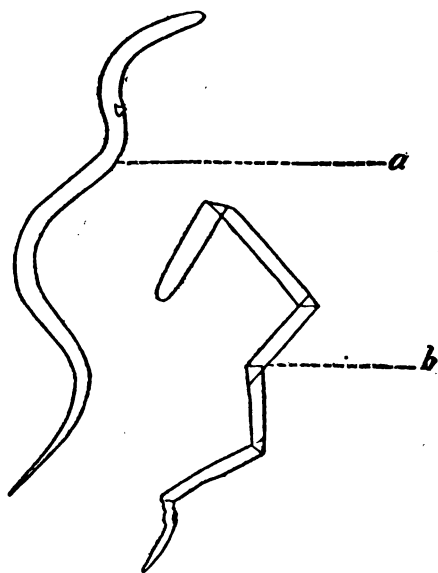
A filaria from the abdomen of a mosquito (a); without its sheath (b).

festly less numerous than in the first insect, and we perceive a number
of empty collapsed filariæ sheaths (Fig. 3, b) scattered about in the viscid
tarry blood. The filariæ are in many instances without their sheaths
(Fig. 3, a); in other specimens in which this is still present they seem
to be engaged in frantic efforts to burst through and to escape from
their sheaths. If you watch you will see that every now and again the
still imprisoned filariæ retires towards the tail end of its sheath, and
then, as a boy gathers momentum for a leap or a ram for a fight, it will
rush rapidly forward, butting the other end with its head. The state
of the blood helps them to effect their purpose. The sheath is carried
before the impact of the head, it is true, but by no means so readily as

when in normal blood. The viscid, tarry condition it is now in holds, as it were, the sheath, giving the contained filaria a better chance to break through. It is just as if you threw a sheet of tissue-paper into the air and as it floated tried to send your fist through it. You cannot. But let some one hold the paper, you can then force your fist through with the utmost ease. The viscid blood holds the sheath in the same way. It is a very curious sight to see the filaria at work, so energetic and so persevering is it. Sometimes you may see the actual rupture take place. Then, as soon as the sheath gives way—and it is always the head end of the sheath which yields—the contained filaria gradually worms its body through the hole it has made, and having thus effected

FIG. 4.
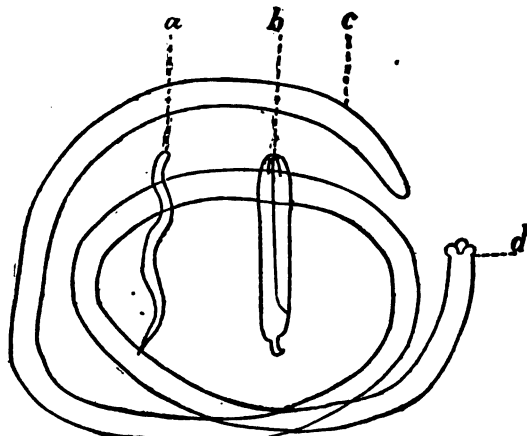
a, a sheathless filaria sanguinis; b, the primitive alimentary canal; c, a fully developed filaria measuring one-fifteenth of an inch in length, with a three-lobed tail end, d.

its own delivery, rapidly wriggles away like a snake that has escaped from a box. This process of sheath-casting you will see in active progress during the first two or three hours after the mosquito has ingested filariated blood. After the lapse of two or three hours, tease up the thorax of another insect, mix the fragments with a little one-half-per-cent. salt solution, removing the coarser pieces so that a cover-glass can be applied. Search with your microscope among the broken-up tissues. You will soon come across dozens of sheathless filariæ (Fig. 4, a) exactly like those in the blood from your patient's finger, and like those in the mosquito's abdomen,—only with this difference, all of them are sheathless. What has happened is this. In the abdomen, so soon as the blood became thickened by the action on the corpuscles of the

digestive juices of the insect, the mechanical condition of blood vis-
cidity was developed; by this the filariæ were enabled to get rid of
their sheaths. The oral armature of the parasite was thus unmuzzled;
the filaria was free to use its weapons, and these it at once brought to
bear on the walls of the mosquito's stomach. The little spine I have
described found a weak spot in the tissues of the stomach; the hooked
lips tore an opening, through this the filaria crept, and so breaking and
boring a passage through the tissues it at last found its way into the
thoracic viscera of the insect. You understand now the meaning and
object of the clumsy sheath the worm trails about with it in the blood;
you understand now why the head of the parasite was muzzled; and
you understand now the object of the formidable cephalic armature.
Suppose there were no sheath or muzzle over the filaria while in the
human body, it would treat the blood-vessels as it does the mosquito's
stomach; it would drill its way at once out of the vessels and escape
into the tissues, and be out of the way of the friendly mosquito. All
this sounds very wonderful, and you may think I am drawing on my
imagination. Not so. Look at certain of the slides I have placed
under the microscope. You will see in some the filariæ still enclosed
in their sheaths; you will see in others the filariæ endeavoring to escape
from their sheaths; and you will see in a third set the filariæ escaped
from their sheaths; and you will find these discarded sheaths empty
and collapsed, and scattered about the preparation. I have often wit-
nessed this sheath-casting in the mosquito's stomach, and I have learned
how to bring it about at will in ordinary blood-slides, by reproducing
by artificial means the physical conditions necessary. So prepare the
blood that it does not thicken, and this is to be done by strict attention
to cleanliness of the finger-tip, freedom from moisture, and the mainte-
nance of a temperature above 60° F., and there will be no escape of
filariæ from their sheaths. But by chilling the blood or by other arti-
ficial means which cause the escape of the hæmoglobin from the blood-
corpuscles and consequent thickening of the serum, and you will at
once cause the filariæ your slides contain to begin to cast their sheaths.
Experiment in this way. Prepare half a dozen slides of filaria blood
in the usual way. Take care that the layer of blood under the cover-
glass is only the thickness of one layer of blood-corpuscles, but that it
is thick enough not to compress the filariæ, and that it permits the cor-
puscles to arrange themselves on their edges. Seal the cover-glasses
with vaseline, and wrap each slide separately in a piece of blotting-
paper, so as to keep out the vapor which otherwise might condense on
the glass and perhaps spoil the preparation. Place the slides thus

wrapped up in a small tin box, and lay the whole on a block of ice in your study. Start the experiment about nine or ten o'clock in the evening, and leave the box on the ice till seven or eight o'clock next morning. Now remove the slides and place them in a warm part of the room, examining them with the microscope at intervals during the day. You will notice first, if the experiment has been successful, that the red corpuscles have all run together, or rather that the hæmoglobin is diffused in a uniform reddish-brown sheet throughout the slides. At first, on removing the slides from the ice, the filariæ, being still under the influence of the cold, move but languidly. You can see their sheaths very distinctly; they are trailing after them. But as the slides warm up to the temperature of the room, the little animals gradually regain their activity, and soon every one of them is engaged in furiously butting the head end of its sheath. One by one, in the course of the day, they succeed in breaking through, so that by evening most of them are swimming about free in the viscid blood, and moving restlessly from place to place,—locomoting, in fact, in a way they did not do while inside their sheaths. They are searching, doubtless, for the walls of the mosquito's stomach which we have deceived them into thinking, if such beasts think, that they have entered. Some get jammed when half out their sheaths. You can see where the hole in the sheath grips them. Most succeed in effecting their escape, and empty sheaths are lying all about the preparations. In a few places, where the blood-corpuscles have not broken down, where they are still in rouleaux, enclosing islands of clear serum, you may come across a stationary filaria still wriggling about on one spot, and still enclosed in its sheath. But wherever the blood has become thickened by effused hæmoglobin, there the filariæ are either out of their sheaths and moving about or they are actively trying to effect their delivery. The slides I have placed under the microscopes illustrating this process, a process which I may call " filarial ecdysis," were prepared yesterday evening and chilled on ice during the night. What you can see in them is an exact reproduction of what takes place in a natural way in the stomach of the mosquito, and is ocular proof that my statements about what goes on in the mosquito are correct. You have under your eyes the explanation of the reason nature had in providing the filaria with a sheath and oral armature, and the reason she had in endowing the filaria with its singular nocturnal habits. I will not weary you with a detailed description of the changes the parasite undergoes in the thorax of the mosquito. Suffice it to say, that once arrived there its movements gradually slow down. It becomes shorter and thicker. By and by an alimentary canal and

four thick fleshy lips are developed (Fig. 4, b).   Then the little animal begins rapidly to increase in size and to move again, and when at the end of from five to seven days the mosquito deposits her eggs on the water, and she herself thereafter dies, the filaria has become a long, active, powerful, formidable-looking animal, one-fifteenth of an inch in length (Fig. 4, c).   If you are myopic, by placing the slide close to your eyes you can just see the filaria moving about.

Thus far we have been able to trace the progress of the parasite in its journey from its primary host, through its intermediary host, and towards its final host, and the whole process has been thoroughly made out.   But now a gap occurs in our knowledge, and it is a gap which some of you, if enthusiastic, may fill in.   You have only to submit yourselves to a very simple and obvious but somewhat dangerous and unpleasant experiment.   Everything points to this, that when the mosquito falls into the water the now enlarged and powerful filariæ she may contain work their way through the sodden tissues, and, having escaped from these, for a time swim about as aquatic animals. If you place a little water on a slide containing one of them at this stage you at once see how kindly they take to the element.   I believe the next step in their life history is their transfer to the stomach of man in drinking water ; everything so points to this that, short of actual demonstration by set experiment, it may be considered as good as proved.   We shall assume that the filaria has been so transferred to the human stomach.   Arrived there, doubtless, just as with the embryo trichina or embryo tape-worm, after penetrating the walls of the alimentary canal, it makes its way through the tissues and gradually works itself into its final home, the lymphatic system, from whence, as we have seen, it started on its life journey.   If you examine one of the filariæ towards the end of its stay in the mosquito you will see a curious organ (Fig. 4, d) with which its caudal end is provided, and which has taken the place of the sharp, attenuated tail characterizing the filaria while in the blood.   This is a sort of three-lobed arrangement, the lobes of which are so arranged that they must fall together when the tail is drawn forward, but open out and expand into a broad tripod when it is pushed back, just as occurs with the foot of a duck or swan in paddling.   This organ I interpret as an arrangement designed to facilitate the progress of the parasite in its passage through the human tissues.   It is an admirable device for securing a firm foothold and purchase to push against, at the same time offering no obstacle to advance.   No trace of this organ is visible in the mature parasite ; it must atrophy and drop off when no longer of service to

the animal. Strange to say, in certain embryo filariæ which have to make a similar passage through the tissues of their final host a similar device is seen. This is the case in the young guinea-worm, in cucullanus,—a parasite of fishes,—and in at least one species of the blood-worms of the dog.

When the young filaria reaches the lymphatics it begins to grow and its reproductive organs to mature. The sexes then come together and impregnation ensues. By and by the embryos are born and launched into the lymph-stream. In this they are carried along through the thoracic duct and so into the blood. Thus another generation of filariæ arises and provision is made for the continuation of the species.

Such I believe to be the life-history of this important parasite. It is, indeed, a very curious and a very wonderful one; so curious and so wonderful, and, at first sight, so improbable that some of you may be inclined to doubt my description and inferences. I can only say I have gone over every step many times. I have described nothing I have not seen, and others have confirmed much of it. On the table under the microscope, you have ocular proof of the truth of many of my statements. There is only one gap, and this I have indicated. Filariation of man by the drinking of water into which the developing filaria has escaped from the mosquito has not been effected as yet, or, so far as I am aware, been attempted in an experimental way. Until this has been successfully effected I cannot claim that the position I take has been proved with mathematical certainty. Practically, however, I consider that my position has been proved. Some may think that the pitfalls, the accidents, the countless enemies that must beset the infant filaria in its journey from the parental uterus in one human host, through the mosquito, into the water, and thence into a second human host, are so numerous and so overwhelming that it is barely possible for one of them to escape and complete the cycle in this way. But you see that nature demands that the chances of any given filaria arriving at maturity shall be small indeed; otherwise they would overwhelm the species which serve them as host, and therefore exterminate themselves,—commit suicide, in fact. At the same time nature's plans must be laid in such a way that it is always possible, however improbable, that some of the embryos shall arrive at maturity. Nature knows the chances against this and meets them by multiplying the numbers that face these chances. I have told you that in the blood there are in some cases as many as 500 embryo filariæ in every drop. It is a simple question in arithmetic to ascer-

tain the number in the entire circulation in such a case. Say the man weighs two hundred pounds, and that he has twenty pounds of blood in his body. Twenty pounds of blood are equal to 115,200 minims. Each of these minims contains 500 filariæ; $115,200 \times 500 = 57,600,000$. That is the number of filariæ in his blood at any given moment; a population about double that of the United Kingdom. But this is not all. The parent filariæ are continually giving birth to new embryos; from this we must infer that the old must die off after a time, otherwise the blood would become overstocked and there would be no room for the corpuscles. We do not know how long the individual embryo lives in the circulation, but let us say about a month or so, and that the swarm is renewed, say ten times in the course of a year. This would put the total crop of embryo filariæ at 576,000,000. And we know that the filariæ live for many years,—often as long as the host; but put its life down at ten years. This would give us 5,760,000,000 as the total number of embryo filariæ that had circulated in such a man's vessels from first to last. These figures convey some conception as to what nature thinks of the risks she has to provide against in securing the continuation of this animal. It is about 5,000,000,000 to one against any given embryo filaria arriving at maturity. But so long as the principle nature works on is sound, sooner or later some filariæ will attain maturity and secure the continuation of the species. Nature knows that mosquitoes suck blood; that mosquitoes die in water; that man drinks water. That being so, she knows that sooner or later a man must drink water in which a mosquito that had fed on the blood of a filariated human being had fallen. It is many millions to one that all these and the other necessary conditions concur, but sooner or later they certainly will.

THE CHEMISTRY OF DIGESTION.

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LADIES AND GENTLEMEN,—Few articles of diet are taken into
the stomach in the exact condition in which it is possible for them to
be absorbed into the system by the blood-vessels and lymphatics. We
eat to live, and while, perhaps, there are those who live to eat, we all
require, as you know, proteids or albuminoids to supply waste and to
build up and support the system, amyloids—*i.e.*, starches and sugars—
to produce muscle-movement, and fats and oils to produce combustion
and heat.

THEORIES OF DIGESTION.

Digestion begins in the mouth and ends in the lower part of the
ileum. Vicarious digestion may also be carried on in the rectum for
some considerable time when the stomach is inadequate to perform its
function. Hippocrates taught that digestion was a process of *stewing*,
and for a long time before the Christian era digestion was regarded as
a cooking process effected by the heat of the stomach. The older physi-
ologists considered digestion a process of *fermentation*, and referred to
the gas frequently escaping from the stomach as proof of their theory.
A thousand years ago digestion was considered to be a *putrefaction*.
The sulphuretted hydrogen gas escaping in the flatus was cited as
proof. It was next believed that digestion was a *trituration*. The
action of the gizzard of the fowl was cited as a perfect example, and
the various sets of muscles found in the human stomach were believed
to be for the purpose of churning the food. The present theory regards
digestion as a *chemical* process principally ; that food dissolves in the
stomach as sugar does in water, and then passes into the blood. To this
chemical theory we now add the vital one. Hence we say that digestion

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is a *chemico-vital* process more or less perfectly understood at the present time. Food is first subjected to the action of the saliva, next to the gastric juice, and then to the bile and the pancreatic and intestinal juices, all of which play a fundamental part in preparing food for assimilation.

The anatomy, physiology, and pathology of all these glands you are no doubt thoroughly familiar with. You all know that saliva is a mixture of parotid, submaxillary, and sublingual secretion, all from serous glands, to which is added the product of the mucous glands in the buccal cavity.

Mastication is the process of mechanical subdivision of food, accomplished by the teeth, tongue, cheeks, and muscles of mastication. The nervous force comes from the motor division of the fifth and the hypoglossal; the sensory force, from the superior division of the fifth, the glosso-pharyngeal, and the reflex from the sympathetic system. Any disease, injury, or abnormal action of the nervous mechanism will interfere materially with the first step in the digestive process.

Insalivation is the intimate admixture of the saliva with the food.

Saliva.—The chemical composition of saliva is as follows:

	Per cent.
Water	99.5.
Ptyalin	.1
Sulphocyanate of K with the salts of Mg, Ca, Na, and K	.2
Organic extracts and serum-albumin	.2

That is, in every one hundred minims of saliva we have one-tenth of a grain of the active principle,—*ptyalin*. The quantity of saliva ordinarily secreted is from one-half to two litres (one to four pints) in twenty-four hours. Food, irritation, and stimulation increase its flow. So do many drugs, such as jaborandi, for instance. The smell or even the thought of savory dishes also stimulates the secretion of saliva.

CHEMICAL ACTION OF SALIVA.

Saliva converts all starches—$C_{12}H_{20}O_{10}$—found in cereals, vegetables, etc., into dextrin, maltose, and finally into dextrose or glucose, in which state alone can starches and sugars be absorbed: $10(C_{12}H_{20}O_{10}) + 8H_2O = 9(C_{12}H_{20}O_{10}) +$ maltose $(C_{12}H_{22}O_{11})$.

Maltose is a kind of sugar having the formula $C_{12}H_{22}O_{11}$. It is allied to cane sugar and subsequently changed into glucose, $C_6H_{12}O_6$, by the ptyalin.

Ptyalin is a chemical ferment of nitrogenous composition, which

converts starch into glucose without undergoing any change itself or suffering diminution.

FERMENTS.

As we shall have occasion to refer to ferments frequently, we may as well understand them from the outset. They are all of nitrogenous composition, capable of producing fermentation without themselves suffering change or diminution. They are divided into two classes,—viz., 1, *organized* and, 2, *unorganized ferments.*

ORGANIZED FERMENTS.

The organized ferments are again divided into three kinds:

(*a*) Mould plant.

(*β*) Yeast plant.

(*γ*) Bacteria.

(*a*) *Mould plants* are microscopic fungi or mycelia,—long, cylindrical cells adhering one to the other. They attack solids by honeycombing them, and they float on liquids. When mould plants cease growing they dry up, and from their own material grow a long stem with a capsule. This contains the spores, which are readily diffused when the capsule breaks. To this organized ferment is due all the mildewing and much decomposition and decay. The development of this mould fungus is seen on wearing apparel when locked up in damp closets.

(*β*) *Yeast Plants.*—*Torula cerevisiæ* or *saccharomyces* belong to a lower order of life. They consist of simple cells with walls of cellulose. Each cell has two or three nuclei. The yeast plant is the active agent in vinous and alcoholic fermentation.

(*γ*) *Bacteria.*—A number of varieties of bacteria are always present in the alimentary canal, from the mouth to the anus. They create a ferment—probably alkaloidal in nature—which is competent to change proteids into peptones, etc.

At this juncture I desire to call your attention to a scientific classification of micro-organisms adopted in England. It is extremely simple, and I believe correct.

There are three classes of micro-organisms,—viz., (*a*) bacteria; (*β*) bacilli; (*γ*) micrococci.

(*a*) The common form of bacterium—*bacterium termo*—is a rod-like body of $\frac{1}{25,000}$ of an inch in breadth, and *less* than twice its breadth in length. It multiplies by fission and not by spores. It is not pathogenetic,—that is, does not produce specific diseases, such as cholera, typhoid fever, etc. Bacteria are never found in living tissues, but

always in putrefying or septic fluids. This explains why so many bacteria find their way into our digestive tract, for, as we shall see later on, a bird is not considered fit for the fashionable table until it is in a state of putrefaction.

(β) The bacillus is also a rod-like body, but it is *more* than twice its breadth in length. It multiplies by both spores and fission. Bacilli are pathogenetic, producing tuberculosis, anthrax, glanders, leprosy, syphilis, tetanus, typhoid fever, cholera, diphtheria, etc.

(γ) Micrococci, on the other hand, are round or oval bodies, $\frac{1}{10,000}$ to $\frac{1}{25,000}$ of an inch in diameter. They occur singly, in pairs (diplococci), or in colonies (zoöglæa). They multiply by fission, and produce diseases such as gonorrhœa, abscesses, erysipelas, septicæmia, pyæmia, etc.

Whilst speaking of organized ferments it is well you should know that *sapræmia* is a disease produced by bacteria. It is best seen in the lying-in chamber, in the post-partum state, when sepsis has been allowed to creep in. On the third or fourth day the parturient woman is taken with a violent chill. The temperature runs up to 105° F., and there is naturally cause for alarm. Under treatment, the parturient tract is rendered aseptic by proper post-partum douches, and the patient recovers perfectly in a day or two. This is a case of sapræmia, where the alkaloidal ferments of *bacteria,* not bacilli or micrococci, have entered the circulation and produced its profound symptoms.

In the case of septicæmia it is quite different. Here the bacilli themselves have gained access to the circulation, where they multiply by the millions. One chill succeeds another, the temperature rises higher and higher, and many of these patients are apt to die unless active treatment be adopted. Both of these affections, depending on entirely different causes, are called puerperal fever. In reality one is sapræmia and the other is septicæmia. These points you will find of value in practice.

UNORGANIZED FERMENTS.

These are divided into (1) amylolytic, (2) proteolytic, (3) invertin, (4) steapsin, and (5) curdling ferments.

1. *Amylolytic ferments* are such as (a) ptyalin in saliva; (β) amylopsin in the pancreatic juice; (γ) diastase in malt, converting starch into dextrin, maltose, and glucose; (δ) the liver ferment, a diastase, turning glycogen into glucose.

2. The *proteolytic ferments* are such as (a) pepsin, in the gastric juice; (β) trypsin, in the pancreatic juice; and (γ) papain, in the papaya fruit; which convert proteids or albuminoids into anti-, hemi-, and

parapeptones. Papain is now extracted from the Indian fruit and sold under the name of papoid. It is a vegetable ferment which is similar to pepsin in its action.

3. *Inversive ferments* (invertins) convert cane sugar or saccharose into dextrose (glucose), grape sugar, and lævulose (fruit sugar). This ferment is found in the succus entericus and in the mucus of the stomach.

4. *Steapsin* is found in the pancreatic juice. Its action consists in the emulsification of fats and oils, breaking them up into fatty acids (oleic, palmitic, and stearic) and glycerin. Lecithin and cholesterin are the ultimate fatty products.

5. *Coagulating Ferments.*—*Rennet* or milk-curdling ferment, found in the pancreas and in all infants' stomachs; *fibrin-forming* ferment, found in the blood, lymph, and chyle.

Myosin is the ferment producing coagulation of the muscle juices (rigor mortis) in a few minutes to many hours after death, according to the mode of death and the condition of the muscle. In hunting rabbits or deer, the dogs will often run down their game. In such cases and in strychnine-poisoning rigor mortis comes on within a few minutes after death. In wasting diseases, on the contrary, rigor mortis is delayed for many hours. Rigor mortis, then, is due to the coagulation of the *myosin*, the juice in the muscular system, on the same principle that rennet coagulates milk or the fibrin-ferment coagulates blood.

In regard to the reaction of salivary digestion : Pure saliva from the parotid gland is alkaline. The secretions from the mucous glands of the buccal cavity are acid. When the two are mixed the whole becomes slightly alkaline.

To separate ptyalin from the parotid : Triturate the gland with sand. Precipitate with alcohol and make an extract with pure glycerin. Alcohol precipitates all proteids, and with them the nitrogenous ferment, ptyalin. The glycerin dissolves *only* the ptyalin ferment.

Tests.—By boiling some starch with water and adding some saliva, we find it reacts to the various tests for glucose. By using the same starch *without* saliva or ptyalin, you observe there is no reaction with any of the tests for glucose. (Fehling's, Trommer's, Moore's, etc.)

On adding a few drops of a solution of ferric chloride to saliva, you observe a red color ; this is the potassio-sulphocyanate of the saliva changed into the ferric sulphocyanate.

Practical Observations on Saliva.—The bacteria in the mouth, such as the "leptothrix buccalis," are frequent causes of the decaying of

teeth. Any antiseptic mouth-wash after each meal will destroy them, and keep the breath sweet and pure.

Masticate the food well, that it may become thoroughly insalivated and the starch converted into dextrin, maltose, and glucose. The salivary glands of children do not develop and become functionally active until about the sixth month; hence the ill effects of giving infants under this age starchy food which they cannot render soluble and capable of absorption.

In cases of dyspepsia the saliva often becomes acid. Starch cannot be converted into glucose in an acid medium, hence in many cases of dyspepsia saliva digestion is suspended. This leads to intestinal indigestion, a condition not readily recognized by practitioners.

Tobacco is injurious, as it is apt to lead to excessive expectoration, which uses up the saliva. This is especially true of " chewing," and to a less extent of smoking. Gum-chewing is likewise unhealthy, as the salivary glands are constantly secreting. The saliva is also swallowed, and, besides being used up, it interferes with gastric assimilation.

STOMACH DIGESTION.

One of the most interesting as well as one of the most important and at the same time one of the most abused organs of the body is the stomach. It is claimed that more people die from overeating than from overdrinking. The stomach is at once man's dearest friend and deadliest enemy. What can be more pleasing to a hungry man than an excellent dinner, and what can be more troublesome than indigestion and chronic dyspepsia ?

The Egyptians, a thousand years before Christ, taught that " the greatest part of the aliment we take is superfluous, which superfluity is the cause of all our distempers."

Hippocrates, four hundred years before Christ, said that " excess in drinking is not quite so bad as excess in eating." Also, " if they who have been accustomed to but one meal a day should chance to take two, they soon grow dull, heavy, and thirsty." Overloading the stomach with food produces thirst, because there is not enough gastric juice to digest it. Hence overeating is a frequent cause of indigestion, dyspepsia, and all the symptoms of gastric disorders. The Father of Medicine had evidently observed that fat people are fond of eating, drinking, and sleeping. Galen, one hundred years before Christ, laid down careful dietary and hygienic rules for himself, *and followed them.* He lived to be one hundred and forty years old.

The capacity of the human stomach is from sixteen to thirty-two

ounces, and during rest or when the food has been digested its contents are alkaline from the gastric mucus; but the moment food or drink is introduced or thought of eating occurs, the gastric juice becomes acid. There are two sets of glands in the stomach, the peptic and the mucous. The peptic glands are found throughout the whole interior of the mucous membrane excepting at the pylorus. They secrete two important substances. The small "granular" cells secrete a zymogen called pepsinogen, from which pepsin is elaborated, and the larger or "peptic" cells secrete the hydrochloric acid. During digestion the granular cells are actively secreting pepsinogen and elaborating pepsin and the mucous glands are inactive, but as soon as the food has left the stomach the peptic glands stop secreting and the mucous glands pour out their alkaline secretion to neutralize the acidity. The stomach produces from ten to twenty pints of gastric juice in twenty-four hours. Of this amount from two-tenths to two per cent. is free hydrochloric acid. Gastric juice is limpid, acid, odorless, and has a mawkish taste. Its specific gravity is 1002. In one thousand parts there are nine hundred and ninety-five parts of water and five parts of solids, of which the pepsin ferment furnishes about three parts and the hydrochloric acid and salts the remaining two parts. The ferment we call pepsin belongs to the unorganized variety, and may be easily extracted by soaking the mucous membrane of a stomach in cold water for one hour, and then macerating it in warm water at 100° F. for two hours. The cold water dissolves and removes the mucus. The warm water dissolves the pepsin, which is readily precipitated from its aqueous solution as grayish-white flocculi by absolute alcohol. Evaporate the alcohol and you have your pure pepsin remaining. A strong glycerin extract may also be made by soaking the mucous membrane in absolute alcohol. This removes the water. Then treat it with pure glycerin, which takes up the ferment only, as in the case of ptyalin. This should teach us the uselessness of adding pepsin to alcoholic menstrua.

The chief function of the gastric juice is to digest all nitrogenous food, such as meat, eggs, bread, milk, etc., called proteids. These by means of the pepsin ferment and the hydrochloric acid are converted into anti-, hemi-, and parapeptones, or albumose, and finally peptones. The peptones, or antipeptones proper, are rapidly absorbed through the blood-vessels in the stomach by means of osmosis. The stomach also absorbs water, wine, and such fluids; but the hemipeptones and albumoses—by-products of stomach digestion, so to speak—are converted by the pancreatic juice into leucin and tyrosin, and are not absorbed as peptones at all.

The gastric juice has no effect on amylaceous and oleaginous articles of food beyond dissolving them in the chyme. Starches are not acted upon at all. Cane sugar becomes hydrated by the gastric mucus and transformed into glucose, the only state, as we shall see, in which sugars can be absorbed. Gastric juice is also antiseptic, preventing or checking putrefaction. This is readily seen when eating high game. Fashion has decreed how we shall eat, what we shall eat, and how it must be prepared. Fashion says that quail and other birds shall hang in the cellar until the meat is ready to drop from the bones. This process of time softens the bird. In other words, putrefaction, with the millions of bacteria which every such piece of game contains, is the proper precooking process of birds! Should any part of these putrid carcasses enter our circulation through any other avenue than the stomach, no one would live twelve hours after eating quail *a la fashion*, but the gastric juice happily converts these decomposed articles into nutritious and absorbable peptones.

TIME OF DIGESTION.

Barley soup, raw eggs whipped, trout, tripe, brains, venison, and boiled milk, with the serum-albumin removed, are digested in from one to two hours; roast beef, lamb, mutton, turkey, chicken, etc., in about three hours; salmon, veal, duck, cabbage, and pork, in from four to six hours, according to the condition of the stomach.

Boiled milk, be it remembered, is more easily digested, besides being vastly more wholesome, than is *raw* milk. The bacilli tuberculosis, which milk is competent to carry from the cow to the human body, will be killed; so will the pathogenic bacilli of cholera, typhoid fever, diphtheria, scarlet fever, etc., and the impurities in the milk under our present system of milk-supply will have been purified by fire. To make boiled milk more digestible than raw milk, it is necessary to skim off the thin film which forms on the surface of boiled milk as it is cooling. This is coagulated serum-albumin, of which milk contains about one-half of one per cent. When this is removed, boiled milk is not so constipating, is more easily digested, is more wholesome, and is free from disease-laden germs. It should be recommended and employed by every one of you until you are sure of getting pure milk.

The average time, under ordinary conditions, in which a meal is digested is from three to four hours. This depends, however, upon the time since food was last taken, its quantity and quality, the state of the stomach, and the state of the mind. You can all recall perhaps

a time in your own experience when a fit of indigestion or non-digestion was superinduced by sudden· fear, anger, or the thoughts of examinations. This is caused by the inhibitory action of the pneumo-gastric and the sympathetic system which stops the secretion of gastric juice. Therefore, if you want to cure a chronic dyspeptic, you must have him dine in pleasant company, and not give him a book or a paper to absorb his attention and prevent the normal secretion of gastric juice.

THE ACID IN THE STOMACH.

There has been for many years considerable discussion relative to the kind of acid found in stomach digestion,—whether lactic acid or hydrochloric acid. One great chemist would find lactic acid in abundance, but no hydrochloric acid, half an hour after digestion began; another great chemist (of another university) would find both lactic and hydrochloric acid about one hour after eating; and a third great chemist would find only hydrochloric acid from one to three hours after taking the meal. Who was right? The truth is, all three were right. The explanation is this: from ten minutes to forty-five minutes after eating, the acidity of the contents of the stomach is due to lactic acid, and hydrochloric acid cannot be demonstrated by the most delicate tests. In about one hour hydrochloric acid begins to predominate, and from this time on lactic acid cannot be demonstrated. This is important to know, as we shall see later on. Lactic acid is probably not secreted by the stomach, but depends upon the acid salts in the food, whilst hydrochloric acid is secreted by the peptic glands in the stomach itself. Lactic acid may also be formed by bacteria acting on the grape sugar ingested; this is called lactic-acid fermentation. In a purely meat diet there is no lactic acid found.

TESTS.

Qualitatively, hydrochloric acid may be determined by filtering the contents of the stomach and adding nitrate of silver. If the hydrochloric acid is present in sufficient quantity, there will be a white precipitate of argentic chloride (AgCl), which is insoluble in nitric acid but soluble in ammonium hydrate. Mercuric nitrate with hydrochloric acid gives a white precipitate of mercurous chloride (Hg_2Cl_2).

Quantitatively considered, one hundred cubic centimetres of the standard solution of argentic nitrate will reduce twenty-five cubic centimetres of hydrochloric acid.

As a rule, the hydrochloric acid in the contents of the stomach is in too small a quantity to react satisfactorily to the above tests, and one of

the delicate chromatic reactions is necessary. The most delicate as well as the most satisfactory in my hands is that known as Boas' test. It consists of resorcin five grammes (seventy-five grains), cane sugar three grammes (forty-five grains), and dilute alcohol one hundred cubic centimetres. This test is applied by heating a few drops of the test-solution with a few drops of the stomach filtrate in a porcelain capsule. If hydrochloric acid be present, a bright red ring appears at the edges of the fluid. Other color or aniline tests are "tropæolin," "Congo red," "benzo-purpurin," "methyl-violet," etc.

Lactic Acid Tests.—Necessarily, the amount of lactic acid in the stomach is small. With this, as with hydrochlorine, it is often necessary to evaporate a pint of the filtrate down to an ounce, in order to concentrate the amount of available acid present for purposes of reaction. Lactic acid with dilute ferric chloride gives a yellowish coloration. By adding a few drops of carbolic acid to this we obtain Uffelmann's amethyst-blue. Mercuric nitrate with lactic acid yields a crimson mercuric lactate.

When butter is heated to 212° F., the fat-globules break and butyric acid is generated. The same applies to other fats and oils. This is a frequent cause of dyspepsia in boarding-house and restaurant-fed people. Hence, avoid heated grease and butyric acid dyspepsia. Alcohol is also formed in the stomach in small quantities from vinous or yeast fermentation.

Of late years the presence or absence of hydrochloric acid in the stomach one hour after a meal has been made use of as a means of diagnosis. In carcinoma of the stomach and certain other pathological conditions hydrochloric acid is absent. Its absence is less constant in atrophic dyspepsia, in amyloid degeneration, in Addison's disease of the suprarenal capsule, in pulmonary tuberculosis, in poisoning or corrosion and loss of mucous membrane, and in mucous catarrh, in which the mucous glands are hypertrophic and produce an excess of mucus, with consequent degeneration of the peptic cells which secrete the hydrochloric acid. In nervous or mental dyspepsia, hydrochloric acid is also frequently absent in part. In gastric ulcer, on the contrary, hydrochloric acid is always in excess. This is a valuable diagnostic point. Suppose a patient is vomiting the so-called "coffee-grounds" material, containing blood. The diagnosis rests between cancer and gastric ulcer. A want of hydrochloric acid indicates cancer, and an excess is pretty certain to indicate ulceration.

Meat contains myosin from the muscles, serum-albumin, gelatin from the interstitial fibrous connective tissue, elastin from the elastic

tissue, hæmoglobin, extractives, and salts. These are all digested in the stomach by means of the pepsin and hydrochloric acid, just as is albumen.

Albumen.—The albumen taken in our food is obtained from the egg, serum, plant, fibrin, casein, etc. By the gastric juice it is converted into the anti-, hemi-, and parapeptones. The first is absorbed in the stomach, and enters the blood-vessels by osmosis. The hemi-peptones and albumoses go on to the pancreatic juice, and are split up into leucin and tyrosin. Leucin assists in the formation of glycogen in the liver, and tyrosin that of urea.

As you are familiar with the many tests for albumen in urine analysis, I will not mention them here; but the test for peptones may not be so familiar to you.

Peptones do not coagulate when heated, and on the addition of carbon dioxide, sodium chloride, magnesium sulphate, and acids yield no precipitate, as is the case with albumen. Peptones dialyze freely. Peptones with saturated solution of picric acid give a precipitate which disappears on heating, but returns to some extent on cooling again. Alcohol precipitates peptones, but does not coagulate them. Potassio-mercuric iodide precipitates peptones. Tannin precipitates peptones. Murexide test of cupric sulphate ($CuSO_4$) with excess of potassium hydrate (KHO) gives a *purple* color with proteids (albumen) and a *pink* with peptones.

The best test for albumen in urine, according to Sir William Roberts, of London, is cold nitric acid in different dilutions. He is able to estimate the percentage of albumen by noting the precipitate with his $\frac{1}{10}$ to $\frac{1}{1000}$ solutions of nitric acid (HNO_3). If you are testing for albumen in urine voided after a meal or after a dose of some alkaloid, such as quinine, peptones may be present, and you may mistake them for albumen, and condemn the poor fellow to death from Bright's disease, when he has only physiological albuminuria or peptonuria, which may occur at each meal-time with anybody.

Bile, as you know, is a viscid, yellowish-green fluid of bitter taste. Bile direct from the liver, however, is neither green nor bitter. It is a bland golden yellow. The greenish cast in man and the bitterness, as well as its viscidity, are due to the admixture of mucus from the gall-bladder. Bile is neutral or slightly alkaline in reaction, and has a specific gravity of 1020. From twenty to forty ounces are secreted daily. You are doubtless familiar with the ordinary tests for bilirubin and biliverdin (Gmelin's), and those for taurocholate and glycocholate of sodium and cholic acid (Pettenkofer's). Bile is formed in the

hepatic cells and secreted continuously. It is stored in the gall-bladder and enters the duodenum by the common duct.

(α) Its function in digestion is the emulsification and saponification of fats and oils. An emulsion is a finely subdivided mixture of fats and water with a suitable vehicle. Saponification, on the other hand, is a chemical formation. An oil or fat is made up of the triatomic alcohol glycerin with one or more fatty acid radicals. When an alkali is added to a fat and heat is applied, the oil or fat is split up into glycerin and its fatty acids,—oleic, palmitic, or stearic. The acid combines with the alkali and forms a soap,—an oleate, a palmitate, or a stearate of potassium or sodium, according to the alkali used. The glycerin floats on the top.

(β) Bile also assists in absorbing fats.

(γ) It is antiseptic.

(δ) It is purgative.

(ε) It precipitates the pepsin and para- and hemipeptones in the chyme as they come from the stomach to allow the pancreatic juice to finish digestion in an alkaline fluid. Bile is also active in changing peptones into serum-albumin for absorption.

The *glycogenic function* of the liver is in itself a large question, and had better be treated physiologically than chemically. No doubt you have already studied it from that stand-point, and the chemical question is too lengthy for consideration at this time. Suffice it to say that glycogen is manufactured by the liver-cells from proteids as well as from amyloids, and by means of the liver-diastase it is changed into glucose for muscle activity.

The *intestinal juices*, or succus entericus, are produced by the glands of Brunner in the duodenum and the glands of Lieberkühn in the small intestine.

The *succus entericus* possesses peptogenic properties, especially the secretion from Brunner's glands, which converts proteids into peptones. Lieberkühn's glands convert starches into sugar. The intestinal juices also hydrate cane sugar and convert it into glucose. They turn grape sugar into lactic and afterwards into butyric acid. They possess milk-curdling properties.

The *pancreatic juice* is (α) amylolytic, (β) proteolytic, (γ) inversive, (δ) steaptic, (ε) milk-curdling. It is alkaline in reaction, and enters the descending duodenum two and a half inches from the pylorus.

SUMMARY.

We have seen that salivary digestion consists in the conversion of starch into dextrine, maltose, and glucose, the only form of sugar that can be absorbed. This, we have seen, is accomplished by the ptyalin. Starch is also metamorphosed into glucose by the amylopsin of the pancreatic juice. Cane sugar becomes glucose in the mucus of the stomach and in the succus entericus. Glucose is absorbed by the blood-vessels and goes to support muscle activity.

Proteids, albuminoids, or the nitrogenous principles of food are converted by the pepsin and hydrochloric acid into the various peptones in the stomach. The antipeptones are absorbed by the stomach. The hemi- and parapeptones, or albumoses, are acted upon by the bile and pancreatic juice and converted into leucin and tyrosin; the former assisting in the production of glycogen, which in its turn is converted into glucose, which again goes to the muscular system. The tyrosin assists in the production of urea through the metabolic changes in the muscular system whereby kreatinin is hydrated into kreatin, and xanthine, hypoxanthine, or sarkin, oxaluric acid, and allantoin are produced. Kreatin then goes back to the liver, where it left, as glucose and tyrosin, and is the direct antecedent of urea. The antecedent of kreatin is keratinin formed in the muscular system. Uric acid is a less oxidized product than urea.

Fats and oils are dissolved in the stomach. Emulsification or fine subdivision and saponification are accomplished by the bile and pancreatic juice. After emulsification the fat is absorbed by the intestinal lacteals. After saponification it is possible for fats to be absorbed by the blood-vessels. Fat is stored up by the body as globular fatty tissues for combustion and heat, or is excreted as lecithin and cholesterin.

The thin, pultaceous chyme which leaves the stomach is acid in reaction, as we have seen. On meeting with the intestinal juices it becomes neutral, and by the time it has reached the middle of the small intestines it becomes alkaline, and so continues. Therefore, in rectal alimentation remember that the nutriment should be alkaline.

The liquids, including the ordinary drinks, such as water, wine, tea, etc., are mostly absorbed in the stomach. Endosmosis and exosmosis are constantly going on during meal-time. Gastric and other juices are secreted, and peptones and other products of digestion are absorbed to replenish the secreting process.

It is a mistake to drink no liquids when eating. The gastric

juice cannot handle a large meal nearly so well nor so rapidly if it is taken dry. The system requires about four pints, or sixty ounces, of fluid in twenty-four hours, and food is much more easily digested and absorbed when from six to eight ounces of liquid are taken with each meal. For this reason a plate of hot soup is excellent before eating. A cup of hot water does very well. It starts the juice and dissolves the food. Ice-water, which so many Americans use to excess, is injurious. It produces a well-marked dyspepsia, rather difficult to cure. Ices taken during a meal or afterwards perhaps do good. They are generally taken in small quantities, and their action is to suspend digestion for a few minutes, to be resumed with renewed vigor.

Alcohol in whatever form should be taken for medicinal purposes *only.* It is a good diffusible stimulant in small quantities, and should not be taken daily during health. Alcohol taken daily acts as an irritant to the mucous membrane of the stomach, and should always be given largely diluted. When taken daily for any length of time it is certain to irritate not only the stomach, but also the liver, kidneys, blood-vessels, and even the brain. Alcohol sets up a slow or chronic hyperplasia of the fibrous and connective tissues, which is certain sooner or later to be productive of considerable mischief. Some of the worst cases of gastric catarrh, with morning vomiting, loss of appetite, chronic congestion of the capillaries, reaching even to the nose, are to be found in persons addicted to the daily use of alcohol. If you desire to possess your mental faculties unimpaired and your internal organs in their normal physiological condition, avoid the too intimate acquaintance of Bacchus.

PARENCHYMATOUS NEPHRITIS; DIABETES.

CLINICAL LECTURE DELIVERED AT THE BUFFALO MEDICAL SCHOOL.

BY CHARLES CARY, M.D.,

Professor of Materia Medica, Therapeutics, and Clinical Medicine in the University of Buffalo, etc.

GENTLEMEN,—The history of the patient is as follows : aged forty-nine, born in England, married, has had eight children, three miscarriages, youngest child eleven years old. While carrying the last child her legs bloated, and at intervals ever since there have been signs of dropsy. For the last four months her face has swollen. Up to four months ago she did her own house-work, though never strong since the bloating began. Father, mother, and one sister died of consumption. Some of her own children seem consumptive, but none have died of the disease. On going up and down stairs she becomes short of breath. Her clothes seem too small for her. For the last three months she has been very weak : even walking, dressing, and undressing have become almost impossible.

On examining the patient, we notice immediately that the abdomen is prominent. Resonance is marked over the entire anterior surface, but there is a suggestive fluctuation and, on tapping the abdomen, the oscillation is plainly visible. The patient states that the abdomen has been much more swollen, and that her feet have been so swollen that the toes could scarcely be distinguished. On the legs are coiled and distended varicose veins, particularly on the inner side of the knee, and on the inner aspects of the feet the veins are conspicuous, though scarcely what might be called varicose. The left leg does not present such marked varicosities as the right, but the pitting is as deep, showing that the œdema is not entirely due to interference with the circulation by varicose veins. We must also take into consideration the fact that the œdema has persisted in spite of her long confinement to bed. The eyelids are swollen. Examining her heart, I hear a long first sound, with an exaggerated muscular quality, giving me the distinct

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impression of power. Accompanying the first sound is a murmur heard anywhere in the vicinity of the apex. It seems to be more pronounced in the first part of the systole, but that may be because the muscle is more strongly contracting at that time. In the axillary region the murmur is indistinct, but this may be due to the œdema and natural thickness of the chest-wall.

The amount of urine passed by the patient in twenty-four hours was, at the first examination, three hundred and fifty cubic centimetres, yellow, acid, urinous, of a specific gravity of 1020, containing albumen and 2.8 grammes of urea. There was a flocculent sediment of epithelial and hyaline casts, squamous, round, and columnar epithelium, and leucocytes. A second examination, not of the twenty-four hours' urine, showed a specific gravity of 1008; otherwise the findings were the same.

The diagnosis is certain: we have to deal with a case of parenchymatous nephritis. The patients with such renal trouble, whom we see in the hospital, usually give a plain cause for their disease in the history of the abuse of alcohol. I am glad to say that the present case is that of a woman who has led an honest life, who has given birth to eight children, who does not know the taste of any alcoholic beverage, and yet, before she has reached the age of fifty she is affected with a well-advanced, chronic, incurable Bright's disease. I recall distinctly several cases occurring in men who were teetotalers. Do not go out into practice with the idea firmly fixed in your minds that alcohol is a certain and potent factor in the production of Bright's disease. You will find people that attain the age of eighty or ninety years who have not been temperate, and who have not developed Bright's disease. Remember, therefore, that, while alcohol is undoubtedly a factor in the production of those arterial changes that bring about Bright's disease, the disease may come on without alcohol, sometimes when it is difficult to assign a cause.

Lead is a recognized cause of Bright's disease. Many persons work in lead, not only those who are employed in the manufactories, but artisans who use the metal, painters, plumbers, tin-smiths, on account of the solder, carriage-painters, type-makers, and many others are exposed to the poisonous effects of lead. Another cause of nephritis, I am quite sure, is the frequent bearing of children. This is, in a measure, a mechanical cause, the enlargement of the uterus bringing about changes in the circulation that may embarrass the kidney. Often, in first pregnancies, we have uræmic convulsions and all the other signs of acute nephritis, the urine being loaded with albumen

and deficient in urea. This patient tells us that she had œdema beginning in her first pregnancy and recurring with each succeeding pregnancy. The renal embarrassment, however, is not entirely mechanical, the additional metabolism of gestation throwing an extra burden on the kidney. This is not a case of gouty or granular kidney, but one in which the epithelial tissues are particularly involved, while the whole gland is doubtless affected.

DIABETES.

In bringing the next patient before you I do not want to give the impression that he suffers from another phase of kidney trouble, and I feel that this caution may be necessary for those members of the class who have recently begun their medical studies, since the fact that in both cases we rely largely on the examination of the urine might appear to indicate an analogy that does not exist.

The history of the case is as follows: F. C., aged twenty-one years; a native of the United States, single. Patient admitted September 3; family history negative. Patient considered himself perfectly well till January last, when he noticed that he was obliged to urinate several times during the night. This symptom was accompanied by great thirst for water. His strength and flesh failed, in spite of the fact that his appetite was excellent and his digestion apparently good. The bowels were obstinately constipated. Has lost twenty pounds during the last seven months. Denies all venereal history; habits have been good with respect to alcohol and tobacco. The patient has two brothers and two sisters older than himself who are well. His mother died of cancer of the stomach, his father of inflammation of the bowels. Knows nothing of his other relatives.

There has been some slight rise of temperature, reaching 100° and descending as low as 96.5° F., but commonly not varying far from the normal in the first week. In the next ten days it was not abnormal. The pulse has ranged about 90. After about a month's record his chart was discontinued.

We have here a series of records of twenty-four-hour samples of urine. The first record was made September 4. Urine, four thousand eight hundred cubic centimetres, pale yellow, superacid, fruity odor, specific gravity 1035, urea fifty-two grammes, no albumen, glucose fifty grammes. He was placed upon a diet absolutely without starch or sugar. After eight days, on September 12, the urine was of a specific gravity of 1032, containing fifty-nine grammes of urea and forty grammes of sugar. On September 15 the sugar had decreased to

twenty-five grammes; on September 21 it had increased again to 37.5 grammes, on account of eating a pear, we believe. In other words, the increase of sugar was more than the total weight of the pear. After that the quantity fell, till the minimum was reached of eighteen grammes, when the amount of urine was four thousand cubic centimetres. The lowest total quantity of urine for the twenty-four hours was three thousand three hundred cubic centimetres.

On inspection of the patient you can see that there has been considerable emaciation, the muscles themselves being shrunken; the skin is very harsh and dry, the abdomen is rather prominent, the tongue is fairly good. His appetite is enormous. On palpation and auscultation there is greater vocal fremitus on the right side than on the left, and the percussion note is slightly higher in pitch. I hear no râles. On comparing the two infraclavicular regions, I simply get diminished respiratory murmur. So far as hepatic dulness is concerned, it seems to be normal. The heart-sounds are strong, and I detect no murmur.

Here is a man twenty-one years of age, with diabetes mellitus. Two practical questions present themselves. What can we do for him, and what is the probable outcome? Those are the main points which I intend discussing. This malady is, fortunately, not very common in this country; it is more frequently seen in some parts of Europe, and it is seen more commonly in the Jewish race than in others. It is also a disease of the well-fed and well-to-do. It is not a poor man's trouble. When it occurs in persons advanced in years, in excessive eaters and excessive drinkers, in fat men, it does not seem to be such a very serious disease. It is a serious malady, however, when it is continuous; it is more serious when it occurs in the young; it is still more serious when it assails a thin youth, and the prognosis is worst when the elimination of sugar in the urine is not stopped by a diet absolutely lacking in starch and sugar. Under such circumstances the disease is very rarely curable. On the whole, I think I am very sanguine for my patients; but the outlook for this young man is about as black as it could be made. In addition to withholding starches and sugars, I have adopted other lines of treatment without the least improvement. The patient is constantly losing weight. My suspicions are further excited, because commonly the end comes along with a pneumonia, very often a tubercular pneumonia, and the examination that I have just given him leads me to think that the deposition of tubercles has already begun; although we get no râles, the diminished respiratory murmur, the increased vocal fremitus, and relative dulness are all confirmatory evidence. So far as the ultimate cause of the sugar is concerned, we

know nothing of its real nature. Certain it is that in this case it has been impossible to check its elimination.

Yesterday I learned for the first time that there had been some error in carrying out the directions. I directed some time ago that he should be put upon doses of codeine, three centigrammes two or three times a day, expecting to increase it as necessary. I was under the impression that the patient had been taking this, and that the result was purely negative, since the sugar persisted in the urine. The patient, it seems, has had only a few doses, and I propose now to give codeine a careful trial, with the forlorn hope that it may prevent the formation of sugar. I say " formation" since none has been administered in the food, and the waste amount must have been newly formed in the body. I have little hope of influencing the disease, however.

[After continuing the codeine treatment for a time, with the result of diminishing the quantity of urine, but at no time of checking the elimination of sugar, the patient left the hospital and was lost sight of. It seems probable that he died very shortly after his departure.]

MALIGNANT ENDOCARDITIS WITH VEGETATIONS IN THE RIGHT AURICLE, AND A PERFORATION OF THE INTER-AURICULAR SEPTUM; MITRAL AND AORTIC REGURGITATION.

CLINICAL LECTURE DELIVERED AT THE POST-GRADUATE MEDICAL SCHOOL, CHICAGO.

BY JOHN A. ROBISON, A.M., M.D.,

Adjunct Professor of Medicine in the Rush Medical College; Professor of General Medicine in the Post-Graduate Medical School; Attending Physician for Throat Diseases and Internal Medicine, Presby-terian Hospital, etc., Chicago.

GENTLEMEN,—In my previous lectures I have made the statement that disease of the right side of the heart is generally due to intra-uterine or congenital causes. It is seldom that we have an opportunity to study a case in adults of post-congenital origin, but I am especially fortunate in being able to present to you to-day the report of a case of disease of the right side of the heart in which the tricuspid valves were involved. This patient some of you saw with me in the hospital a few days ago. The history was as follows:

L. W. entered the Presbyterian Hospital on the 21st of December, 1894. He is a boiler-maker by occupation, single, twenty-one years of age. Family history good. About fourteen months ago he fell from a scaffold, striking his chest upon the ground in the region of the heart. The marks of the injury were visible in the præcordial region. There was osteomyelitis of the left fourth, fifth, and sixth ribs near their costo-sternal articulations. He thought he was injured internally also, and was confined to his bed for several days. Since that time he has suffered a good deal of pain in the præcordial region, but has never been seriously ill until nine weeks ago, when he noticed shortness of breath, pain in the region of the heart, in the back, and his legs were slightly swollen before he came to the hospital. You will notice that he cannot lie down in bed. His movements are painful. There is an anæmic and pallid appearance of the face and anxious countenance,

with slight cyanosis. His skin is covered with a profuse, cold perspiration. The respirations are shallow and rapid; his tongue is furred; his digestion very poor. He has no appetite; there is great thirst, and the bowels are constipated. His most troublesome symptoms are dyspnœa and insomnia.

Physical examination of the heart shows the apex beat is very slightly moved downward and to the left, but there is marked increase

Fɪɢ. 1.
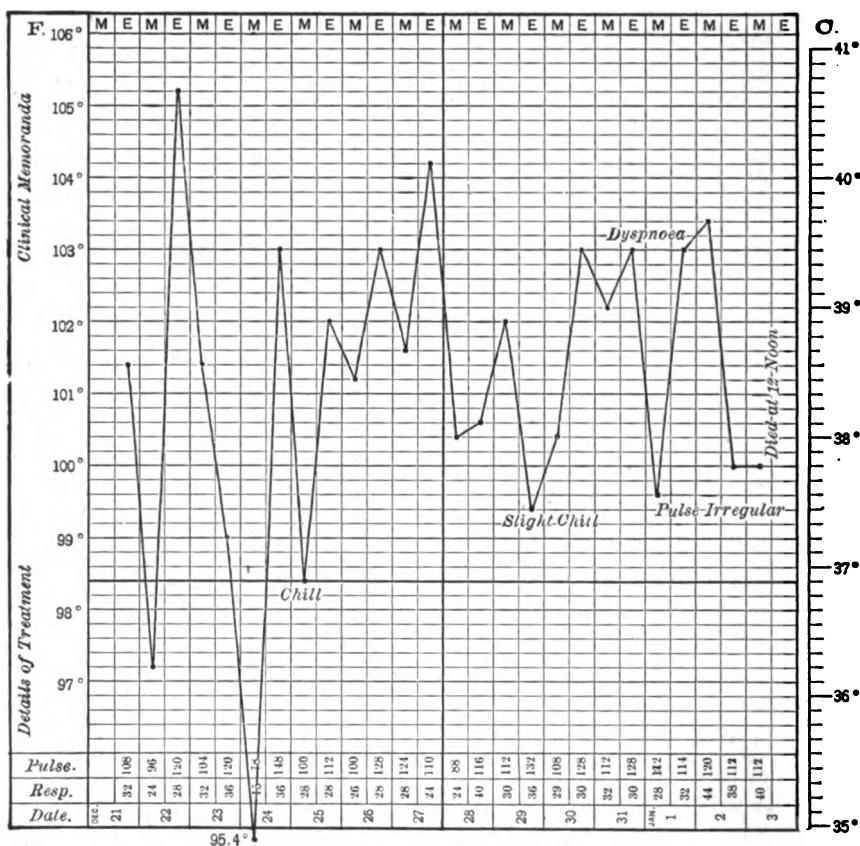
Temperature chart of a case of malignant endocarditis.

in the superficial and deep areas of cardiac dulness; the transverse diameter of the heart seems increased; there is also epigastric pulsation and lessening of the oblique angle between the heart and the liver. There is a blowing systolic murmur heard a little above and to the left of the ensiform cartilage, which becomes less towards the apex. You also notice excessive jugular congestion and a venous pulse.

I here show you a chart of the temperature, pulse, and respirations from the time of the patient's entrance to the hospital (the 21st of December) until his death on the 3d of January. (Fig. 1.) The highest temperature at any one time was on the second day, when it was 105° in the afternoon, pulse 120, respirations 28. In the forenoon of the fourth day the temperature fell to 95.4°, pulse 78, and respirations 15. In the afternoon, about 2 P.M., he had a severe chill, and the temperature rose to 103°, pulse 148, respirations 36. The next day it was normal in the morning, and rose to 102° in the afternoon, and fluctuated between 104° and 99.4° until noon of the 3d of January, when he died. On the ninth day after admission to the hospital he had a slight chill in the afternoon, on the tenth there was extreme dyspnœa, and the next day the pulse became very weak, irregular, and intermittent, and finally he died from cardiac exhaustion. You will notice from the chart that the pulse varied in its frequency as well as the respirations.

The following sphygmographic tracing (Fig. 2) was taken the third day after the patient's admission into the hospital. It will be noticed

FIG. 2.
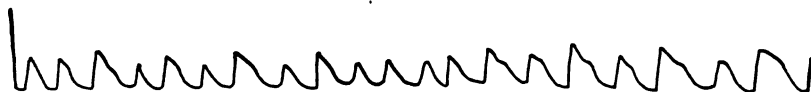
Sphygmographic tracing of the pulse in malignant endocarditis.

that this tracing is similar to that which we obtain in aneurism of the ascending portion of the arch of the aorta. There is evidently retardation of the pulse-waves, and there is not sufficient elastic recoil of the arteries to produce the ordinary curves.

The physical signs that have already been elicited point to the fact that the disease is due to insufficiency of the tricuspid valves. What form of disease would produce tricuspid insufficiency? It might be simple endocarditis or malignant endocarditis, or an infectious disease with endocarditis, or the result of chronic valvular disease. In simple endocarditis there is generally present rheumatic fever with no marked symptoms of cardiac disease; whereas in malignant endocarditis there need not necessarily be any rheumatism; the constitutional symptoms are more severe, and indications of grave heart-disease rapidly develop. The patient is subject to rigors, profuse perspirations, and intermittent or remittent forms of fever, and embolic infarctions may occur. Typhoid or pyæmic symptoms are common, and the disease is gen-- erally fatal and runs a rapid course. Again, malignant endocarditis

might be mistaken for typhoid fever; but the former disease begins abruptly, progresses rapidly, high temperature is remittent, and the remissions frequently fall below normal; whereas in the latter disease there is a gradual rise and fall of temperature before and after the fastigium. In malignant endocarditis the pulse is increased in frequency independently of the fever; whereas in typhoid the pulse is increased coincidently with the fever. In malignant endocarditis there is evidence of valvular heart-disease in the earliest stages; the symptoms of embolic infarction are common; whereas in typhoid fever there is seldom endocarditis; the abdominal symptoms are marked and characteristic of the fever; and, finally, there is the presence of the typhoid bacillus.

Again, malignant endocarditis may be confounded with ague. In the former disease, however, the intermissions are seldom regular; whereas in the latter they are. The constitutional symptoms are more severe in the former, and the latter runs a longer course and is seldom fatal. Finally, no evidence exists of disease of the other valves. Therefore all signs point to the fact that this case is one of malignant endocarditis affecting the right side of the heart.

It is stated that malignant endocarditis more frequently affects women than men, being especially liable to accompany puerperal fever. It is also stated that not over two per cent. of the cases of endocarditis that arise after birth occur in the right side of the heart.

There is, undoubtedly, a casual relation between the osteomyelitis that we find present and the existing malignant endocarditis; and there is little doubt in my mind that the commencement of this disease dates from the time of his injury fourteen months ago. There was, doubtless, endocarditis produced then, and vegetations were formed, and the disease recently assumed a malignant form.

Post-mortem.—This heart weighs thirteen ounces; the aortic and pulmonic valves are normal. There is no hypertrophy of the left ventricle, but there is a slight degree of hypertrophy in the right ventricle, which measures at its thickest part three-eighths of an inch. There is dilatation of the right auricle, it holding about an ounce and a half of fluid. At the base of the front anterior segment of the tricuspid valve upon its auricular surface there is a vegetation about an inch in length, situated upon an oblong base half an inch long and one-quarter of an inch wide, and projecting into the cavity at least half an inch. Near the end of the vegetation on the auricular septum, just at the upper margin of the auriculo-ventricular cavities, there is a perforation leading from the right auricle into the left auricle, piercing the walls of
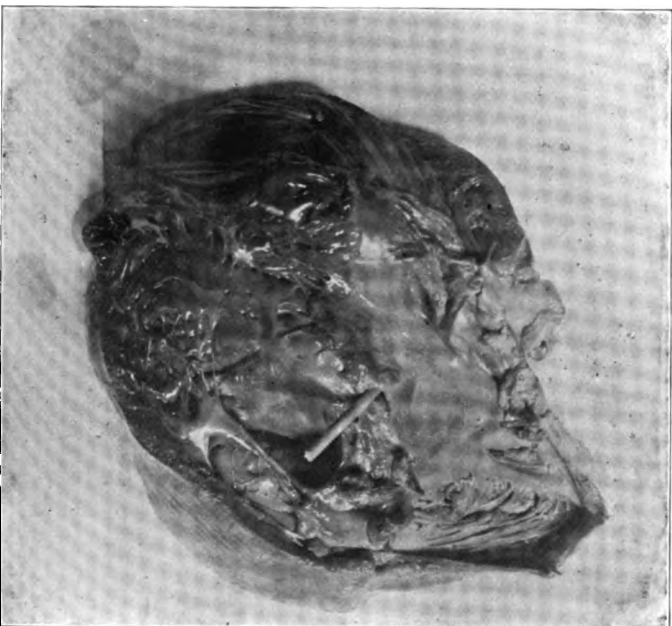
Fig. 3.—Interior of right auricle and ventricle. A bristle has been introduced into the perforation in the inter-auricular septum. Upon the auricular surface of the anterior segment of the tricuspid valve a large vegetation with an oblong base is situated.

Fig. 4.—Interior of left auricle and ventricle. A bristle is seen protruding from the inter-auricular septum just below the aortic valves. The perforation measures one-quarter of an inch in diameter. The ventricular walls are not hypertrophied.

the latter just below the aortic valves. This perforation is one-quarter of an inch in diameter. Dr. D. D. Bishop made cultures from the granulations and demonstrated the presence of the staphylococcus pyogenes aureus. Examination of sections of the granulations demonstrates the presence of the same organism. The examination of the specimen shows that there were, undoubtedly, three abnormal currents of blood produced during the heart's action : (1) A tricuspid direct current ; (2) a tricuspid regurgitant current ; and (3) a current from the left side of the heart into the right side through the perforation during systole. During the systole of the heart a murmur would be produced which was heard, as has already been stated, over the lower portion of the sternum near the ensiform cartilage ; but this murmur was lost as we approached the base or apex of the heart. The cause of the jugular congestion and venous pulse was undoubtedly the dilated condition of the right auricle and the tricuspid insufficiency, as has been admirably explained by Paul, which permits the blood propelled by the ventricle to flow back into the vein.

The photographs show the position of the granulations above the tricuspid cusp and the perforation in the septum. (Figs. 3 and 4.)

Recapitulation of the Signs and Symptoms of Tricuspid Incompetence.—Dilatation of the right auricle and ventricle lessens the supply of blood to the systemic arterial circulation, and the normal sphygmographic tracing is lost ; at each contraction of the right ventricle the backward flow of blood into the superior and inferior venæ cavæ produces a venous pulsation in the neck and sometimes in the liver. There is a soft-blowing systolic murmur in the tricuspid area, propagated upward and to the right. There is increased dulness over the lower end of the sternum and epigastric cardiac impulse. These patients suffer from dyspnœa and insomnia. I think there is such a disturbance of the cerebral circulation that it causes sleeplessness.

MITRAL AND AORTIC REGURGITATION.

Having reviewed the signs and symptoms that accompany tricuspid regurgitation, I desire to relate a case of mitral and aortic regurgitation to illustrate the difference in the signs and symptoms which occur in the separate forms of disease.

F. C., single, American, aged twenty-three years ; admitted to the hospital December 17, 1893. Several years ago he had an attack of pneumonia, followed in two months by inflammatory rheumatism. The rheumatism was brought on by exposure to cold, and he was confined to his bed for seven months, after which he apparently completely

recovered. The patient then went to California and remained well for a time, working at blacksmithing. In January, 1891, he noticed that he was short of breath during active exercise. A second attack of rheumatism confined the patient to bed for two weeks. Soon after this, however, he began to work at times, but not steadily. Subsequently he felt weak and fainted several times, and had great distress in the heart. This was followed by œdema of the lower extremities, anasarca, and ascites. Patient's habits are temperate. On inspection we notice anæmia, puffiness of the eyelids, blue lips; skin is pale; pulse very weak and variable; has a great deal of thirst; pulsation of the carotids and venous pulsation of the external jugular; hands club-shaped; cyanosis of the finger-tips and lips; apex-beat of the heart is four inches below and one inch to the left of the nipple. By palpation, there is marked fremitus over the præcordial region; the apex-beat strikes forcibly against the chest-wall; the pulse is full, but recedes rapidly from the fingers; the areas of heart-dulness are increased; the deep area of cardiac dulness extends from the right edge of the sternum at the junction of the second rib down to the ensiform cartilage, then to the left about four inches below the nipple, one inch to the left of the mammary line; then upward around the nipple in a curved line to the sternum with the junction of the second rib. On auscultation there is a murmur at the apex during systole transmitted to the left, also a murmur at the base of the heart with the second sound. His pulse varied during his stay in the hospital from 82 beats to 120; temperature was either normal or subnormal; respirations from 22 to 30. The amount of urine varied from seventeen to twenty-nine ounces daily. From the 5th until the 16th of January he expectorated a slight amount of blood daily, and a portion of the time he was delirious at night. He had severe attacks of retching and slight vomiting. Urinalysis on January 3 showed the urine dark, amber color, alkaline reaction, specific gravity 1022; albumen sixteen and a half per cent.; phosphates. January 6, urinalysis, same result, except the specific gravity was raised to 1030. January 13, color dark brown, reaction neutral, specific gravity 1025; albumen eighty per cent.; phosphates in the blood.

The patient was given alcoholic sweats daily, and a diuretic pill, composed of one grain each of powdered digitalis, nitrate of potash, extract of buchu, and citrate of caffeine, three times a day for several days. A short time thereafter the albumen began to disappear from the urine, the ascites and anasarca became less, the patient's appetite returned, and he convalesced so that he was able to return to his home.

The hypertrophied heart in this case caused the arteries to be suddenly filled with blood at each systole, and the aortic regurgitation allowed them to be as quickly emptied, producing the characteristic water-hammer pulse. The area of cardiac dulness extended downward and to the left, and the murmurs were propagated in their usual directions respectively.

The mitral regurgitation caused dyspnœa, orthopnœa, œdema, anasarca, and albuminuria in their turn, while the aortic regurgitation produced the painful symptoms of over-distention of the heart cavities, cardiac distress, palpitation, intermittent and irregular heart-action, and syncope. The pulmonary circulation was greatly embarrassed, as evidenced by cyanosis and hæmoptysis.

Having looked upon these clinical pictures, the question of treatment presents itself. Unfortunately, the first case was one in which treatment is of little avail. Had it been a case of simple tricuspid incompetency without any malignancy, the treatment could be summed up in a few words: treat tricuspid incompetency in the same manner as mitral incompetency.

Before the failure of compensation the treatment of mitral incompetency, simple or complicated with aortic incompetency, should consist in maintaining nutrition at its highest perfection, by giving easily assimilated diet, keeping the digestive and eliminating organs active, having a serene mind, a quiet life, taking gentle exercise in the open air, and the avoidance of excesses of all kinds, Turkish baths and strong purgations. In the latter stages of the disease give cautiously the cardiac tonics, and treat the symptoms as they arise.

Neurology.

ALCOHOLIC PERIPHERAL NEURITIS.

BY W. HALE WHITE, M.D.,

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GENTLEMEN,—The patient before you, who is now in Stephen Ward under me, is a laborer, aged thirty-six, who has drunk hard, and who originally came into the hospital under Dr. Pitt, in April, 1888. In February of that year he first experienced weakness of the feet; this spread up the legs, and finally invaded the hands and arms. He had also had numbness and pricking sensations in the toes and fingers. On admission, in 1888, he was unable to stand; his hands and arms were weak, movements were ataxic, the hands were tremulous. Tactile and painful sensations were much impaired below the elbow and over the whole of the lower extremities, the muscles of which were painful on pressure, especially those of the calves. The knee-jerks were absent and the plantar reflex was slight. Some muscles showed a mild degree of the reaction of degeneration. He left in September, 1888, able to walk and much improved.

Since his discharge he has sometimes got drunk, and on September 16, 1894, he drank half a pint of gin in the evening. The next day he felt weak in the legs, and had tingling in them and in the arms. On admission, September 24, he was as you see him, except that the symptoms were more severe. He cannot stand; the muscles of the lower extremities are very weak. You notice there is well-marked foot-drop. The hands and arms are also very weak, and there is slight wrist-drop; the dynamometer shows only 15 in either hand; the movements of both are ataxic. There is great tenderness of the calves, of the soles of the feet, and in between the toes, the external popliteal nerves are slightly tender. Tactile and painful sensations in the feet are diminished; the temperature sense is unaffected; the sense of localization is impaired. The sensory symptoms are similar in the upper extremities. Knee-jerks and plantar reflexes absent; slight reaction of

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degeneration in some muscles. The heart, respiration, bladder, and rectum are unaffected. There is no evidence of cirrhosis. It is stated that when he was seen in the out-patient department, on September 20, the knee-jerk was increased. He has not complained of cramps. He was kept at rest in bed with sand-bags to support the feet, and was given five minims of liquor strychninæ hydrochloratis subcutaneously once a day. As he showed signs of twitching, this was, on October 2, left off, and he was given cod-liver oil and perchloride of iron and quassia mixture. At first the weakness and sensory symptoms increased, but lately he has improved in all respects.

Now, gentlemen, in this case the diagnosis did not give rise to any difficulty, for the intense tenderness of the muscles showed that some local disease was present there, and we know of no disease of the muscles themselves accompanied by this intense tenderness, and therefore we concluded that it was due to inflammation of the minute nerves lying in between the muscular fasciculi,—in fact, that the patient had peripheral neuritis. Having made this diagnosis, the next thing to do was to see whether the presence of other symptoms confirmed it.

1. *Sensory Symptoms.*—(a) Tenderness of nerves. Peripheral neuritis, as its name implies, affects the smaller twigs of nerves rather than the larger branches, hence the muscular tenderness, which can be elicited by griping a muscle and so compressing the nerves in it, is by far the most important diagnostic sign of peripheral neuritis. It is, as in this case, especially well marked in the calves in the alcoholic form. Tenderness of nerves is next best observed in those of the feet, hence, as in our patient, there is great tenderness of the digital nerves on pressure between the clefts of the toes and of the internal plantar nerves on pressing on them where they become superficial. This tenderness is less marked over the external popliteal and musculo-cutaneous nerves. Sometimes the cutaneous nerves are especially affected, and, consequently, the skin is excessively tender, as in a woman under my care in Miriam. So marked was this symptom in her that the bed-clothes had to be kept off the legs by a cradle.

(b) Impairment of function of sensory nerves. Now you would expect that in the early stages of the disease there would be signs of irritation of the nerves, followed by the loss of their function, and this is exactly what happens. Our patient complained of having had a pricking sensation in the feet, and tingling and pricking are very commonly experienced in the early stages of peripheral neuritis. Patients also sometimes complain of a burning sensation. Later we get evidence of loss of function; the patient has patches of anæsthesia distributed

irregularly about the extremities. Generally this anæsthesia, as in the man before you, refers to both tactile and painful impressions. He also is unable to locate accurately the point of contact when he is touched with a pin. A patient who was in Mary Ward last year was often ten inches out. The temperature sense is normal in our present patient, but quite commonly it is seriously impaired, as, for instance, in the woman just mentioned. It is usually stated that the muscle-sense is rarely impaired, but last year two women were in Mary Ward at almost the same time, who both showed considerable impairment of muscle-sense.

2. *Motor Symptoms.*—In the early stages of peripheral neuritis the motor symptoms are indicative of irritation, and the patient may have cramps from painful contraction of the muscles. This was very marked in a case Dr. F. Taylor has recorded. The irritative stage soon passes off, and the muscles lose power in varying degrees; some are often completely paralyzed. It is a curious thing that the muscles of the head, face, neck, and trunk usually escape, and the paralysis is commonly more evident in the hands and toes than in the rest of the extremities. The neuritis, therefore, is not only peripheral as regards the ends of nerves, but also as regards the periphery of the extremities. Further, one arm or one leg is hardly ever affected unless the other arm or leg also suffer. I will now demonstrate all these points to you in the present patient. With such a disease as peripheral neuritis, it is, of course, extremely likely that all the muscles moving any part and all parts of each muscle will be paralyzed in equal degree, and, therefore, some ataxy of movement may be present. You see it well when this man attempts to touch my finger. It is very important that you should remember this, for if not, you may conclude that a patient has locomotor ataxy when in reality he is suffering from peripheral neuritis. The tremor met with in some cases may, perhaps, be due to the uneven manner in which, owing to the peripheral neuritis, impulses can arrive at the muscles.

The broad outline, then, that we have learned is that a patient with peripheral neuritis will come to you because of bilateral loss of power in the extremities, beginning at their periphery and spreading up them. You will find the muscles very tender on pressure, and he will tell you that the disease began with numbness and tingling. The other symptoms to which I want to direct your attention are,—

3. *The Reflexes.*—The important fact to be grasped is that the knee-jerk is nearly always absent,—a fact of great diagnostic value. Its absence is not surprising, as you know that for its production a reflex

arc is necessary. This consists of afferent nerves from the muscles of the thigh, probably the vastus internus, spinal-cord cells, and efferent nerves to the quadriceps. When you tap the patellar tendon, tension is put upon the afferent nerves, consequently they are stimulated and the jerk takes place. The knee-jerk is so commonly and so early lost in peripheral neuritis, long before the quadriceps is unable to move the leg, that we conclude that these afferent nerves are very prone to be affected early in this disease. But for many years I have taught, and I think now it is generally admitted, that, much more commonly than was formerly thought, the knee-jerk is very early in the case, during the irritative stage, decidedly increased for a little while. This increase is often overlooked because it lasts for so short a time, is so quickly succeeded by loss, and occurs so early. The knee-jerk was observed to be increased in our patient four days after the commencement of his illness. Last year I saw a man in whom the knee-jerks were absent, but when he first put himself under his doctor's care they were very excessive; but the most remarkable case I have met with was that of a woman in an advanced condition of alcoholic neuritis, with foot-drop and no plantar reflex, although a knee-jerk was present. The other deep reflexes, as the wrist- and elbow-jerks, are usually absent. The condition of the superficial reflexes depends entirely upon the degree of affection of the cutaneous and muscular nerves; usually, as you see in our patient, they are absent. If there is hyperæsthesia of the skin they may be exaggerated.

4. *Reaction of Degeneration.*—The patient before you exemplifies the usual condition, for a complete reaction of degeneration in any muscle is decidedly rare, and he had only a partial reaction. Most often, as in this case, there is a diminution of the faradic excitability, and in some of the muscles a reversal of the normal formula for galvanism. Probably the reason why the reaction is partial is that, as the neuritis is chiefly of the smaller nerves in between the muscular fasciculi, different parts of the same muscle have different degrees of the reaction, while in some parts the reaction is normal. The result is that the muscle as a whole shows an atypical reaction of degeneration.

5. *Muscular Wasting.*—In an advanced case the wasting is extreme, as you may often see; but if the patient quickly begins to mend, as is the case with the man before you, little or no wasting will be present. Another reason why wasting is often not noticed, probably, is that some fibres only of the muscle are affected, so that wasting of the muscle as a whole is difficult to detect. From what you have learned about the peripheral distribution of the neuritis, you hardly

require to have it pointed out that wasting of the intrinsic muscles of the hand and foot is especially likely to be seen, and this is undoubtedly so, but the wasting may extend to many other muscles, as, for instance, it did in a woman in Mary Ward, in whom the glutæi were markedly atrophied.

6. *Deformities.*—These are of the utmost importance, and our patient shows the two commonest, which are almost diagnostic of peripheral neuritis. You see that when he puts his arms out his hands drop, because his extensors are more paralyzed than his flexors, —in other words, he has wrist-drop; and you see that his feet drop because the extensors on the front of his legs are more paralyzed than the flexors on the back. Remember, therefore, it is a rule that in peripheral neuritis the extensors are weaker than the flexors, and therefore wrist-drop and foot-drop are of the utmost importance. Many other deformities may be seen in peripheral neuritis due to the unequal paralysis of muscles, but we will not examine them now, as our patient does not show them. If the case lasts long and is improperly treated, serious permanent deformities result from this unequal paraly- sis of the muscles. It is your duty to be specially careful to prevent these. If the patient is able to walk, the foot-drop gives rise to a characteristic high-stepping gait which I often pointed out to you in a patient in Mary Ward last summer. The patient raises the heel too high when she walks; indeed, it may hardly ever touch the ground, and she walks on the toes, because, owing to the paralysis of the ex- tensors, they always drop down, and the sole of the foot cannot be got horizontal. Occasionally, when the atrophy of the muscles is very marked, that of itself will give rise to deformities.

7. *Trophic Disturbances.*—These are not common in rapid cases, like the one before you, but sometimes you see attacks of flushing; the feet, for instance, become red, and the patient complains of burning; at other times vaso-motor constriction leads to pallor and coldness. You will remember that in a clinical lecture last year we discussed the importance of this in connection with Raynaud's disease and erythromelalgia. As the case becomes chronic, trophic disorders are more often seen, but they can hardly be called common. The skin be- comes dry and glossy, especially that of the fingers, as in a typical case in Stephen Ward some four years ago. The nails and hair become brittle, and there may be arthritic adhesions, but I think, on the whole, that trophic lesions are more often seen in the neuritis of individual nerves than in multiple neuritis, as an instance of which I may men- tion the case of a man suffering from rheumatic neuritis of the middle

and internal cutaneous nerves of the right thigh, which was accompanied by an herpetic eruption along them. Never forget the valuable diagnostic fact that bedsores are very rare in peripheral neuritis.

8. *The Pulse.*—The condition of this is of the utmost importance, for in severe cases, if the vagus is affected with neuritis, the pulse becomes rapid and irregular, and the patient dies from cardiac failure. I can give you the following cases of rapid pulse in peripheral neuritis I have recently seen: A woman admitted into Mary February 14, 1893, pulse very rapid; in spite of digitalis the rapidity increased to 160, and she died February 18. Two other women in Mary had pulses of 110 and 96 respectively. A man, a typical case, pulse 110, and irregular even while in bed: he recovered. A woman, when first seen, pulse 120. Twelve days after, pulse 160; death eight hours after she was seen. You see, therefore, that death from cardiac failure, the symptoms of which are a rapid and irregular pulse, is by no means uncommon in peripheral neuritis; in fact, I think you will find it to be the most frequent way in which neuritis kills the patient.

9. *The Respiration.*—Neuritis may affect the phrenics. This was so in a man I saw in Bright Ward. He had as a consequence irregular and feeble action of the diaphragm, the lungs became blocked, and he died of pneumonia. Sometimes you will find the diaphragm completely paralyzed. Please, therefore, bear in mind that neuritis of the phrenics may occur, and that it is a most serious complication.

The points we have just gone over refer to all cases of multiple peripheral neuritis. Now, I want to direct your attention to points especially characteristic of the alcoholic variety.

(*a*) It is much commoner in women than in men.

(*b*) The local tenderness of small nerves and muscles is very marked.

(*c*) The extensors on the front of the leg are first affected, hence the high-stepping gait already mentioned, and the foot-drop is early and diagnostically a very important symptom. Wrist-drop comes later.

(*d*) The symptoms of cirrhosis of the liver are not so common as you would expect. Often, as in our patient, there is no evidence of it. Perhaps the reason is that after absorption the alcohol is arrested by the liver, it sets up cirrhosis, and being stopped there, does not get into the general circulation and so affect the peripheral nerves. As cirrhosis is often absent, so also some patients with alcoholic neuritis do not complain of digestive troubles.

(*e*) Cramps and tremors are more common in alcoholic than in other forms of neuritis.

(*f*) The mental symptoms which are frequently a result of alcohol

are very commonly associated with alcoholic neuritis. Perhaps the most characteristic are the deceit which women will practise to obtain alcohol, and the lying with which they will cover their deceit. Along with the lying and the deceit there is often a repulsively degrading selfishness. I know the case of a woman who was out of health ; no cause could be found. Her husband was determined to try and cure her depression, so he resigned his prospects and position in England and went to the expense of taking his wife round the world. She was perfectly aware that this was a great sacrifice, yet she allowed it, although she knew that the cause of her trouble was her habit of eau-de-Cologne drinking. She was accidentally found out when they returned. It will often take you many, many days of careful observation to detect the secret drinking, and even when you have found it, the patient will deny to your face that she drinks as calmly and unblushingly as if she were discussing the weather. Do not forget eau de Cologne. I have known two or three cases of this habit and one of methylated-spirit drinking.

Treatment.—This is useless unless the alcohol is stopped absolutely. This often means putting the patient in a home under trustworthy nurses, for she will bribe her own servants to get the drink somehow or another. The next thing, and of immense importance, is complete rest in bed, and the patient must not be allowed to be cold. If the case is not too acute galvanism and massage of the muscles will be of great use to keep up their nutrition, and will in every way benefit the patient, but they must not be used if there is much tenderness or pain. Strychnine subcutaneously is often given for the same reason in chronic cases, for which also mercury and iodide of potassium may be employed as absorbents, frequently, I am sure, with benefit. Cod-liver oil and iron are often of use, and the patient before you has great faith in their efficacy, although usually they are given more for the chronic forms. Never forget that if you do not keep the foot supported, when ankle-drop is well-marked, it may become fixed in a useless position, so that when the patient is well of his neuritis you will have to put him under another course of treatment to rectify his deformity, for which he will not thank you.

Pathological Anatomy.—Our patient is improving so under treatment that fortunately you will not have—unless he takes to drink again—any opportunity of examining his nerves. There are, however, so many cases in which this opportunity occurs that I think we ought to describe what is found. The first thing to notice is that after death, as during life, the neuritis is found to be much more marked in the

smaller twigs of the nerves of the feet, hands, leg, and forearm than
in the larger nerve-trunks. A case of peripheral neuritis in which the
brachial plexus is implicated is unusually severe, and the nerve-roots
are nearly always free. In neuritis of single nerves the connective
tissue sheath is considerably inflamed, but in the multiple variety the
neuritis is chiefly parenchymatous. In our patient probably no naked-
eye changes would be discernible; he is not ill enough for that, but the
microscope would show the sheath of the nerves to be infiltrated with
leucocytes, but not to any large extent, and as he has had the disease
before there might be some increase of fibrous tissue, a remnant of his
former neuritis. The change observed in the sheath extends to its
septa, and the vessels are thickened. The chief alteration is, however,
seen in the nerve-fibres themselves, which have undergone a parenchy-
matous change. The myeline is broken up and has become granular;
sometimes this altered myeline distends the sheath, at others it is ab-
sorbed, and leaves the sheath empty; the nerve-fibres themselves
appear in transverse sections as degenerate dots, staining darkly with
osmic acid. In any case in which the alterations in the connective
tissue and the parenchymatous changes are both present, the latter will
be found at their maximum intensity in the minute intramuscular twigs,
whilst the former will chiefly be met with in nerves sufficiently large
to be named, as, for example, the anterior tibial.

In the muscles, as in their nerves, the changes are of two kinds:
the interstitial consists of a multiplication of the nuclei of the connec-
tive tissue sheath and its septa, together with vascular dilatation. After
a time the amount of connective tissue increases. The parenchymatous
change is shown by the loss of the normal striations, and by the fact
that the muscle fibre itself becomes granular. As might be expected,
from what we have said about the reaction of degeneration, the dif-
ferent fibres of the same muscle are affected very unequally. You may
find a very degenerate fibre side by side with a healthy one. With
regard to the mode of production of these changes, all we can say is
that alcohol circulating in the blood has a special tendency to cause
neuritis—especially the parenchymatous variety—of the peripheral
nerves of the limbs, and that this neuritis leads to a trophic change in
the muscles. Why alcohol should particularly pick out the branches
of the anterior tibial nerve and should select the branches of the
musculo-spiral nerve we cannot say. It is one of the ultimate facts
of medicine that we no more understand than we do why the scarlet
fever poison should cause a rash beginning on the trunk, and that of
the poison of measles is first seen on the forehead. Possibly it is the

extreme ends of the nerves rather than the trunks which are affected, because they present less resistance to the poisoned blood.

Diagnosis.—Probably formerly there was much confusion between diseases of the cord and peripheral neuritis ; now I think this is not the case, for it is being recognized that bedsores and persistent exaggerated knee-jerk with ankle-clonus are very important symptoms of disease of the cord, while tenderness of muscles and wrist- and foot-drop are very significant of neuritis.   I think the most frequent mistake is that mild cases of neuritis are set down as chronic rheumatism, because the patient comes saying that he has some difficulty of walking and pain in the legs.   If you will remember that in peripheral neuritis the pain is rarely in the joints and in rheumatism it frequently is, you will be saved many a mistake.   The reason why the patient suffering from neuritis often gives the impression that the pain is in the joint is that he feels a pain on movement.   This is the pain in the muscles caused by traction on them when the joint is moved.   With regard to neuralgia, remember that the pain caused by it is hardly ever bilateral, while that of peripheral neuritis is commonly felt in corresponding extremities.

CEREBELLAR TUMORS.

BY G. L. WALTON, M.D.,

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GENTLEMEN,—The patient I have to show you to-day, a man of about twenty, single, commenced to complain about four months ago of headache and vomiting. The headache was seated principally in the frontal region on both sides. It has been dull in character and intermittent, the periods of intermission gradually shortening. It has, on the whole, increased in severity. The headache is often accompanied by nausea and vomiting. Vomiting is quite apt to occur on rising in the morning, and has had throughout no connection with the ingestion of food. Both these symptoms have, on the whole, increased during the past four months, the onset being insidious. The patient has complained, at times, of vertigo, with a very decided tendency to fall forwards, and on one occasion has actually fallen. Loss of vision has been coming on during the same period, until it has now reached its maximum, the patient being almost totally blind, and only able to get about with the greatest difficulty. His history, further than this, is negative, there being no loss of power in any extremity, no facial paralysis, no history of double vision or of strabismus, no deafness, no numbness. There is no specific history, either as regards primary or secondary symptoms. The family history is negative, both as regards disturbances of the nervous system and the tuberculous diathesis. The patient has no cough, but is subject to night-sweats, and complains of a general lack of strength. He has lost some flesh.

Proceeding to make a provisional diagnosis of the nature of the lesion on the history, we probably have to do with a central nervous lesion of gradual onset and growth. The onset of the symptoms being, of course, too gradual for us to consider hemorrhage or embolus, we are left with abscess and tumor. There is nothing in the etiology pointing to abscess, which generally results either from extension from other

structures or from metastasis. We are left, therefore, with a prob-
ability of new growth. In this case we are able to make a provisional
diagnosis of the seat as well as the nature of the lesion before proceed-
ing to the physical examination. In the first place the headache, vom-
iting, and dizziness are all cerebral symptoms. The blindness, of
course, also points in this direction, assuming that we shall exclude
disease of the eye itself. The seat of the headache (frontal) aids us
very little in the localization, as tumors in almost any region of the
brain may produce headache in almost any location. We have an
entire absence of positive symptoms pointing to the cerebrum, although
it by no means follows that the cerebrum is intact, for extensive lesions
may occur in this locality without symptoms, as we have already had
occasion to see. Vomiting and vertigo, while general symptoms of
tumor in any locality, are especially apt to occur in tumor of the cere-
bellum. It is also true that loss of vision from optic atrophy is apt to
be more marked in cases of cerebellar tumor than in cases where other
regions are affected. Our tendency is therefore to localize this tumor
in the cerebellum. It is true that retraction of the head, often present
in cerebellar tumor, is absent, and that staggering gait is wanting. It
is also true that cerebellar tumors are apt to produce occipital headache
and pain in the back of the neck, either with or without frontal head-
ache. These are not, however, essential symptoms.

Proceeding to the physical examination, we find that this patient
walks without staggering or reeling,—walks very well, in fact, con-
sidering his difficulty in vision. We find also no loss of power in any
muscle or group of muscles, either in the extremities, in the face, or in
the ocular muscles. Careful examination as regards sensation proves
equally negative, including the examination of the distribution of the
trifacial nerve, which it is always important to investigate in such
cases. His knee-jerk is not marked, but is present on both sides. The
plantar reflex is wanting; the cremasteric, abdominal, and epigastric
reflexes are present. His nutrition is fair only. He is a man of
rather slender build. There is, however, no definite atrophy of any
muscle or group of muscles. Examination of the heart and lungs is
negative. His hearing is unimpaired. In testing his vision, remember
the three grades of loss of vision, the moderate grade being tested by
the types, a more marked loss being tested by having the patient count
fingers, the most marked by ascertaining whether he is able to dis-
tinguish light from dark. We find that with the left eye he can dis-
tinguish light from dark, but cannot count fingers accurately at any
distance. In this test I place him with his back to the light, and place

my fingers, widely separated, against my coat. I find that with the right eye he can count my fingers, similarly placed, with comparative ease, at a distance of a dozen feet or more ; so that I resort to the test type, and find that he sees the type which should be seen, normally, at a distance of a hundred feet, at a distance of two feet. His vision, therefore, in the right eye may be fairly represented at two one-hundredths ; the numerator showing the degree of vision, the denominator normal vision. In making these tests you will observe that I have had him carefully cover the eye which was not being tested. Examination of the fundus shows an extremely well-marked double optic neuritis, with hemorrhages.

The physical examination of this case confirms the opinion which we had already formed,—namely, that we have to do with a tumor of the cerebellum. Referring to the diagram of the cortex of the brain, we find that there is no symptom pointing to involvement of any of the recognized regions. The frontal lobes subserving the higher intellectual faculties, a lesion there tends to produce disordered judgment and alteration of character ; lesions of the occipital lobe and angular gyrus tend to produce disorders of vision (hemianopsia, mind blindness), of which we have no evidence here beyond the loss of vision produced by the optic neuritis ; the temporal lobes have to do with hearing, which is not disturbed ; and the well-known regions about the fissure of Rolando are certainly unaffected.

Here I would like to call your attention to a very simple method of remembering the exact location of the different movements subserved by the cerebral cortex, proposed by Lauder Brunton, with an extension which I would propose, which shall include the other recognized centres on the cortex. Brunton begins with the movements of the eyes in the frontal region, and travelling over the motor region, follows the movements made by Eve in eating the forbidden fruit and in carrying it to Adam. The addition I propose includes, as well, the prefrontal and the occipital and temporal lobes ; otherwise I have followed Brunton with trifling modification. Commencing in the region marked " mind," which is divided by Dana into attention, control, and volition, we find Eve's attention concentrated on the subject of the apple ; she is, however, controlling herself, and exercising the will power necessary to resist the temptation. Passing down to the speech centre, we find her talking of it to Adam. Proceeding now with Brunton up the precentral region, we find her turning her eyes, then her head, towards the tree ; then down anterior to the fissure of Rolando, first her shoulder, then her arm, wrist, fingers, and thumb are

brought into play in grasping the forbidden fruit. Her eyes are then closed to enjoy the act of mastication. She smiles, masticates, and swallows the apple. Proceeding up behind the fissure of Rolando, we find her removing the refuse from her mouth and throwing it away, calling into play first her thumb and fingers, then her wrist, arm, and shoulder. Passing up to the leg centres, she extends first her toes, to carry the fruit to Adam; then brings into play in succession the foot,

FIG. 1.
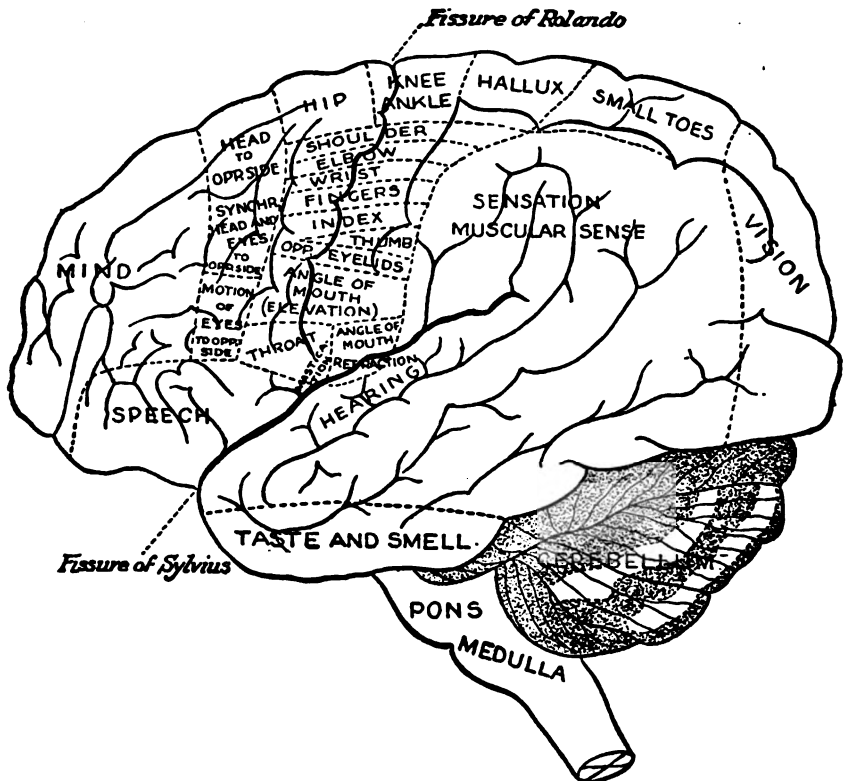
Recognized cortical areas. (After Dana.)

leg, knee, and hip. Again, extending Brunton's idea, we make a circle from the occipital lobe through the angular gyrus to the temporal lobe, represented by Adam seeing the apple; then realizing that he sees it (mind vision);[1] feeling it, then feeling that he holds it, then looking

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[1] The centres for mind vision and conjugate deviation do not appear on this diagram, but may be considered approximately to lie respectively above and below the centres marked "sensation" and "muscular sense."

around (conjugate deviation) on hearing the voice of the Lord in the Garden, having, however, meantime tasted and smelled the forbidden fruit.

The localization of our tumor in the cerebellar region is largely done through exclusion, therefore, the only positive symptom being the frequency of nausea and vomiting, and the vertigo, with the definite tendency to fall forwards, together with the intensity of the optic neuritis, none of these symptoms being absolutely diagnostic, though very strongly suggestive.

With regard to the character of the tumor, we have to consider, as among the most probable, a gumma, a sarcoma, a glioma, or a tubercle. The gumma we have excluded, as far as we ever can, by the lack of symptoms or signs of specific disease. Gliomata and tubercles are more common in the cerebellum than sarcomata; so that the chances are that we have to do with one of these two forms of tumor. The general aspect of the patient, the night-sweats, and the delicate build suggest tubercle, and I strongly suspect that this is the form of tumor with which we have to do, especially as tubercles of the cerebellum are by no means infrequent in early adult life. We shall watch this patient carefully for further developments. The direction in which to look for further symptoms in case of extension of the process is, in the first place, paralysis of the cranial nerves through pressure downwards; paralysis of the extremities due to pressure upon the pyramidal tracts; retraction of the neck; exaggeration or complete loss of the knee-jerk, there being no constant rule as to which of these changes takes place in cerebellar tumor. A staggering gait may also be expected, of a character varying somewhat from that of spinal ataxia in that the jerky movements are absent, and the tendency is rather to sway and reel. Tremor may also appear. Convulsions sometimes occur, but not so frequently as in cases of tumor at or near the cortex, involving the Rolandic region. We shall, of course, be on the look-out for the appearance of tubercle in other parts of the body.

As regards the exact location of the new growth in the cerebellum, this is always a difficult point to determine. Experiments upon animals have shown in a general way that a lesion of certain parts of the cerebellum tends to produce rotation away from the lesion, provided the lesion is irritative; and towards it in case it is destructive. Lesion of one or the other cerebellar peduncle tends to produce a rotation towards or away from the affected peduncle, while lesions anteriorly and posteriorly in the middle lobe of the cerebellum tend to produce rotation forwards or backwards, as the case may be. In this case the tendency

is to fall forward.   Whether we have to do, therefore, with a destructive lesion in the anterior part of the middle lobe or an irritative lesion in the posterior part, we are unable to determine.   This difficulty exists in all these cases, and handicaps us somewhat when we come to consider the question of operation.

As regards the question of operation, McBurney and Starr have recently collected all the reported cases of operation upon cerebellar tumors, and find that out of thirteen cases, in seven the tumor was not found; in two it was found, but not removed; in two it was removed, with recovery (excepting that blindness and deafness persisted); and in two removed with a fatal result.   We have, therefore, only two successful cases out of thirteen attempts.   This is certainly not a very encouraging prospect, and leads us to be very chary of recommending operation in this class of cases.   Still, when we consider the fatality of the cases and the severity of the symptoms,—the unendurable headache, the constant tendency to vertigo and vomiting, in case the trouble becomes severe,—operation should always be taken into consideration.   And in this case, provided the symptoms increase to that degree that life is unendurable and a fatal result inevitable, we shall certainly consider it, not, however, with the enthusiasm which we should feel in case the cerebral hemispheres were involved at or near the cortex.

It should be remembered that simple trephining without incision of the dura mater may afford relief of the headache for a considerable period.

With regard to the technique of the operation, in case this is undertaken, McBurney makes a vertical tongue-shaped or horseshoe-shaped flap over the occipital bone on the side to be operated upon, the upper free convex border of the flap corresponding nearly to the superior curved line of the occipital bone, the attached base being on the back of the neck about opposite the second cervical vertebra.   The incision is carried down to the periosteum, and all the coverings removed in one flap.   This operator considers the safest and most convenient method of entering the cerebellar fossa to be by the use of the chisel and mallet, an opening of about one and a half inches in diameter being made through the bone, care being taken to be far enough away from the large venous sinuses.   The dura being incised and laid back as a flap, the finger may be introduced.   In one of his cases it was found easy to introduce the finger for some distance into the skull on all sides of the cerebellar hemisphere, enabling the operator to examine a large part of its surface and distinctly palpate the lateral and vertical sinuses. This failed to demonstrate the existence of the tumor. and there was so

much protrusion of cerebellar tissue that it was necessary to shave off the excess in order to close the opening in the skull in a satisfactory manner. In a second case a probe was passed some distance, perhaps one and a half inches, into the brain-substance without encountering abnormal resistance. After this an aspirating needle was introduced, about half an inch from the median line, parallel with the base of the skull, which entered a cyst from which two drachms of clear serous fluid was withdrawn. A second introduction of the needle failed to detect the cyst, and it was deemed unwise to make further exploration. The autopsy revealed a large glio-sarcoma, two and a half by two by one inch, which occupied the vermiform lobe of the cerebellum and extended into both hemispheres, chiefly into the right one. In its centre was the cyst which had been evacuated by the aspiration. The first case died about two weeks after operation, the second about six days.

I quote these cases to show the difficulty encountered in locating and removing satisfactorily tumors from this region, even when they have been properly diagnosticated.

Typical cases of cerebellar tumor are not likely to be mistaken. It must be borne in mind, however, that these cases are not infrequently obscure, and elude diagnosis,—first, through lack of characteristic symptoms, and, secondly, through long periods of latency, to which cerebellar tumors seem peculiarly liable. During these periods of latency a suspicion of cerebellar tumor, perhaps already aroused, is apt to be allayed, especially if some of the characteristic symptoms, as blindness or retraction of the head, were wanting at the onset of the case. Persistent headaches in children and young girls should always rouse the suspicion of cerebellar tumor where errors of refraction and the other ordinary causes of reflex headache are eliminated. This is especially true in cases where the patellar reflex is wanting. In young girls we are especially in danger of making the diagnosis hysteria or neurasthenia.

I have here the notes of two cases illustrating the difficulty of diagnosis in this class of cases. The first case was seen in consultation with Dr. Pierce, of Milton. This young lady was a book-keeper, who had worked for three years very steadily. She had complained of neuralgia in the head for many years, more especially over her eyes. This was somewhat relieved by glasses. The headache complained of when I saw her began about two months previously, and used to wake her up at night, improving, but lasting during the day; not, however, preventing her work until one month ago, when she gave it up.

She vomited for a time about two and a half weeks ago. There was no dizziness at that time, although she formerly complained of dizziness before giving up her work. The vertigo would come on if she turned quickly. There has been no trouble with the gait, no tinnitus aurium; some difficulty of hearing in the left ear. There was a history of similar pain in the head six years ago, for which she required the use of morphine. Her work was very confining, keeping her late evenings in a close place. The patient had been very capricious and fussy, wearing out her attendants with incessant demands for air, to be fanned, to have her hair combed, etc.

The patient lay in bed, with the head sometimes drawn backwards, but sometimes drawn forward. The pulse was of good character, the nutrition rather poor. There was no disturbance of the reflexes, and no disorder of motion or sensation; no rigidity; no tenderness excepting of the scalp. There was so great intolerance of light that ophthalmoscopical examination was practically impossible, but there was no apparent diminution of vision. There was so great tenderness of the scalp as to amount to hyperæsthesia, and the patient begged to have her hair brushed continually, and during my visit wished to be fanned, and to have the window opened,—in short, required continuous attention, and was extremely fretful.

Here was a case with symptoms of marked hysterical tendency, and extremely negative as far as definite symptoms of local organic disease were concerned; and yet the tumor had so far advanced that the patient died within a month of that time, very definite symptoms appearing in the interim, strabismus occurring about a week after my visit, disappearing, then becoming constant; five days before death the tongue being deviated to the left and the face drawn to the right. Three days before death there was paralysis of the muscles of deglutition, and during the last twenty-four hours of life complete paralysis of the limbs, with spasmodic contractions of the muscles of the neck, the head being definitely drawn backward. The patient was partially conscious to the end. Death apparently took place from asthenia. These symptoms were sent me by Dr. Pierce, together with the brain, which showed a tumor replacing the anterior lobes of the cerebellum on the left. (See Fig. 2.)

The other case was one seen in consultation with Drs. Johnson and Pierson, of Salem. This was a young lady nineteen years of age, who had always been well, though rather delicate, till about three and a half years ago, when she suffered from profound anæmia, and had nervous symptoms similar to those which she had at the time of my visit. At

the time of this previous illness the headaches were so extreme that meningeal trouble was feared. She would lie with her head drawn violently back. She suffered also from stomach crises, with vomiting, and had alarming fainting turns. Complete recovery followed, however, alarming as these symptoms appeared, and the following winter the patient went out, rode horseback, and appeared as well as ever.

During the winter previous to my examination the same symptoms

FIG. 2.
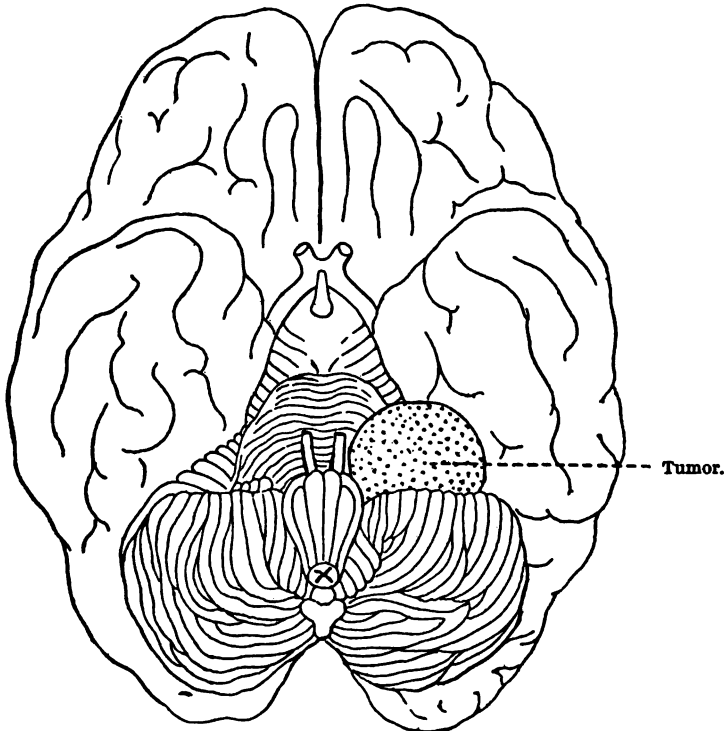
Site of a cerebellar tumor.

recurred, the appetite became capricious, and headache has been more or less constantly complained of, together with an occasional thickness of speech. The tongue had been tremulous, and the throat sometimes filled with mucus. Occasionally she would complain of seeing double, which Dr. Coggin, the oculist, thought due to lack of muscular coordination. He found no optic neuritis. There was retroversion of the uterus. The headaches, which occurred about every day, yielded to phenacetin. The three months before my examination she had spent

on the lounge or in bed.   In the spring she had measles, and in May
what appeared to be *la grippe*.   There has been some vomiting.   Ex-
amination showed great loss of nutrition, the legs being quite wasted.
The tongue was somewhat furred.   There was no special tenderness in
any part, and no loss of motion or sensation.   The tendon reflex was
absent.   She complained of numbness of the face, but no objective anæs-
thesia was found.   Examination of the fundus showed a little haziness,
but nothing sufficiently definite to be called optic neuritis.   There were
no hemorrhages.   The sight was apparently unaffected.   An absolute
diagnosis was not made at this time, it being considered that the
symptoms pointed towards cerebellar tumor ; and yet that in the absence
of optic neuritis, and in consideration of the fact that symptoms in
every way similar, and equally severe, had occurred three and a half
years previously, with complete disappearance, it was considered pos-
sible that the entire trouble was functional.

This patient died about a month later, and autopsy revealed a
glioma occupying the right hemisphere of the cerebellum.

EARLY OCULAR SYMPTOMS IN LOCOMOTOR ATAXIA, WITH FOUR CASES.

CLINICAL LECTURE DELIVERED AT CHARING CROSS HOSPITAL, LONDON.

BY F. W. MOTT, M.D., F.R.C.P.,

Assistant Physician to the Hospital.

GENTLEMEN,—Locomotor ataxia is a common disease in the out-patient department of a general hospital, but cases of ataxia in which the early symptoms are various ocular paralyses, defects of vision, and blindness of one or both eyes are less frequently seen, the reason being that most of these cases go to the ophthalmic hospitals. By a curious coincidence four such cases have within the last few weeks been sent to me, illustrating some very interesting and important facts relating to the diagnosis and prognosis of the disease. Before we consider these cases, however, let us examine an ordinary case of locomotor ataxia.

W. T. has come here for the first time. There is no difficulty in diagnosing this case; the man tells you himself that he is suffering from locomotor ataxy. He is an engine-driver, aged forty-two, and says that for some time past he has noticed that he had difficulty in getting about his engine, especially in the dark, and for the last three months he has been obliged to give up his work altogether. Latterly a perforating ulcer has appeared in a corn on the little toe of the left foot, which has prevented him getting about at all. He has many other symptoms characteristic of a well-marked case of tabes in the second stage,—viz., lightning pains, incoördination, feeling of flannel in the soles of· the feet, partial loss of tactile sensation and power of localization of pain with delayed transmission, bladder troubles, etc., but *no ocular symptoms,* not even the Argyll-Robertson pupil. I emphasize this because, as we shall see, when the spinal symptoms are well marked the ocular symptoms are often latent or absent altogether; whereas, when the ocular symptoms are marked, the spinal symptoms are usually very slight or absent; even a great number of years may elapse before they manifest themselves.

CASE I.—The first case to which I wish to call your attention, C. B., aged thirty-nine, a fish-curer, was sent to me by Mr. Waterhouse as a case of optic atrophy for diagnosis. He had lately been suffering with vomiting and some headache. He has had venereal disease, probably syphilis. The first thing the patient noticed in connection with his eyes was a drooping of the left eyelid about six months ago. A little later he suffered with dimness of vision of the left eye: things appeared blurred; and this rapidly progressed to almost complete blindness. He then went to Moorfields Hospital, but did not improve. About a week ago the patient noticed that he had drooping of the right eyelid and the same dimness of vision in that eye, which has rapidly progressed, and he tells us he has suffered pain, first in one and then in both eyeballs. You will see this drooping of the eyelids, particularly of the left. There is also considerable paresis of the muscles supplied by the motor oculi. If you ask him to look down, you will see that the left eye rotates a little outward and then decidedly inward, the former movement being probably due to the overaction of the superior oblique muscle; the latter I am unable to explain, excepting as the result of paralysis of the inferior oblique. The pupils are not small, and they do not react to light; possibly the *right* does react slightly to mental accommodation. Examination of the fundus oculi shows well-marked gray atrophy of the disks, with some excavation, seen especially on the left side. The sclerotic ring is seen to be well marked, and the disk itself has a grayish appearance. The vessels are curved somewhat and of normal size. *Even with his blindness the man has very little difficulty in walking, and he can stand with his heels together.* Are we then right in assuming that this is a case of locomotor ataxy? He tells us that he has had shooting pains in the legs, and his knee-jerks are entirely absent, and on close inspection of his gait it will be noticed that he brings his heels down on the ground first, and walks with rather a broad base. I have no hesitation in saying that this is a case of locomotor ataxy in the pre-ataxic stage, and it is possible, even probable, that years may elapse before he will pass into the ataxic condition. Experience confirms this opinion, for I shall show you a case in which the patient remained fourteen years in the pre-ataxic stage, and most authorities agree that ataxy which comes on with early ocular symptoms generally remains for a long time in this pre-ataxic condition.

CASE II.—William H., aged fifty-four, teacher of the blind, suffered with syphilis thirty years ago. When he was forty, he first lost sight in the left eye, experiencing first a dimness of vision, which rapidly

progressed to complete blindness; the right eye was then affected similarly.

The pupils, as you see, are extremely small, and do not react to light. There is no obvious *external* ophthalmoplegia. For twelve years he has remained in the pre-ataxic stage; no spinal symptoms which caused him any inconvenience have developed during that time, and he has been able to walk with a stick and stand with his heels together. Two years ago he began to suffer with shooting, lightning-like pains in the legs, and you now see that he has the well-marked ataxic gait, which, owing to muscular incoördination, causes him to raise his feet too high from the ground and bring the heels down first. He cannot stand with his heels together, and he experiences a feeling of numbness in the soles of the feet, as if he were walking on flannel. The knee-jerks are absent,—very probably they have been so from the appearance of the earliest ocular symptoms; they certainly have been abolished in the other three cases from the very first. This would not trouble the patient, although such a clinical fact is of the greatest diagnostic importance to the physician. If we test sensation we find that there is considerable blunting of tactile sensation in the lower limbs, wrong localization and considerable delay in the transmission, as shown by the fact that he does not respond to touch or even painful sensation nearly so readily as the normal.

This case is of extreme interest in showing the long delay that may occur before the ataxic stage comes on, a point of great value in prognosis, because when once the ataxic stage is well established, the probability is that the case will sooner or later pass into the third stage of generalization of symptoms, wasting and paralysis, and death from some intercurrent affection.

Gowers relates a case in which twenty years elapsed between the blindness and optic atrophy and the onset of the ataxia, and Déjérine considers that early ocular symptoms enable one to give a favorable prognosis as regards length of life, owing to the absence or late appearance usually of the spinal symptoms.

CASE III.—J. W., aged thirty-eight, by occupation a clerk, was sent to me by Mr. Donald Gunn. He has been attending the Westminster Ophthalmic Hospital, and the report shows that he has gray atrophy of both disks and limitation of the field of vision in both eyes. The pupils react to accommodation but not to light (Argyll-Robertson). The first symptom of disease was manifested to this patient by " double vision," and in order to do his work he had to close one eye to get rid of the false image. He does not know that he has ever had syphilis,

but it cannot be excluded. For many years he has suffered from "cramps" in the legs. He has no difficulty in standing with his eyes shut and his heels together. There is no strabismus now, and you observe that he can follow the finger in all directions with both eyes and that there is no diplopia. The *knee-jerks are absent*. He has a difficulty in walking along a chalk-line, but if he does not look at the line but up at the ceiling this difficulty disappears. The spinal guiding sensations from the soles of his feet are then normal, and this would agree with the fact that there is no numbness in the feet nor feeling of walking on flannel.

This case permits us to test *color-vision* which the other cases did not, and we find that he can distinguish red from green. Frequently in these cases there is difficulty of distinguishing these colors. Although there is a peripheral defect in the field of vision, as shown by the perimetric charts, yet central vision is fairly good.

Here, then, is a case which has remained in the pre-ataxic stage eight years, and yet we have the right to state that this is a case of locomotor ataxy, *early ocular paralysis causing diplopia, gray optic atrophy, Argyll-Robertson pupils, absent knee-jerks and cramps of the legs being sufficient evidence to state that it is a case in the pre-ataxic stage.*

We must not be over-confident in the *prognosis* of the late development or complete absence of the ataxic symptoms in these cases of early ocular paralysis, or we shall be deceived, for it happens that in talking to C. B. (Case I.), the fish-curer, he told me that another fellow-workman was suffering with the same complaint, and this morning, at my request, he has brought his comrade with him, and you will observe that the latter has a decided ataxic gait as he is being led towards me. We will proceed to examine this case.

E. T., aged forty-one, by occupation a fish-curer.[1] This man had syphilis twenty years ago, but was treated only for a few weeks. His present illness began about five months ago by dimness of vision. "Everything looked as if there was a fog round it." He found he had difficulty in walking and he complained of shooting pains in his legs, not very severe, however. The progressive failure of vision which has now culminated in almost total blindness caused him to think little of the pain and his ataxic condition, and, like most of these cases, he at first went to the ophthalmic department of a hospital. You will

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[1] In their occupation they burn oak-dust, the fumes of which are very irritating to the eyes. Whether this has had any influence in determining the seat of lesion I cannot say, but it is a curious coincidence that two men with the same lesion should come from the same factory.

notice that he has some *ptosis* in both eyes ; that he cannot elevate the
eyes ; that the *pupils* are of medium size, and do *not react to light*, but
that there is a slight reaction on mental accommodation, as when he is
first told to look at the window and then shown a lighted match a yard
or two off.   He cannot distinguish even the brightest lights with his
right eye ; there appears to be left a little vision to bright lights on the
nasal side of the retina of the left eye.   On examination of the disks,
there is well-marked gray atrophy, the sclerotic ring is distinct, the ves-
sels are a little curved and of normal size.   The knee-jerks are absent ;
he has great difficulty in standing with his heels together, and he walks
with an ataxic gait.   There is no numbness or feeling of flannel on the
soles of the feet, and no loss of cutaneous sensation.   He can tell fairly
well the differences in weight between objects held in his hands, but he
seems to have some difficulty, as you see, when asked to touch his nose
with his left fore finger.   Hearing is defective on the right side,—this
is sometimes an early symptom in ataxy,—but he tells us that he has
always been deaf in that ear and that it has not recently become worse.

This patient is an exception to the general rule, for we find an ataxic
condition coming on simultaneously with the ocular symptoms, and al-
though, therefore, we can in these cases as a rule give a favorable prog-
nosis as to life, on account of the long pre-ataxic period, yet it is not
safe to make any absolute statement to that effect.

These four cases offer interesting illustrations of the modes in which
the ocular symptoms may come on.   It will be seen that the oculo-
motor nerves are especially liable to be affected, causing ptosis, diplopia,
paresis, and paralysis of various movements.   Notice how compara-
tively suddenly these ocular paralyses came on, and how partial they
are ; they are usually also fugitive, and we shall probably find in these
patients some of the paralysis pass off.   Late ocular paralyses, on the
other hand, are progressive, complete, and lasting.   The former are
probably due to neuritis or simple congestion of the nerves, the latter
to alteration of their nuclei of origin.

Probably about twenty-five per cent. of locomotor cases begin with
ocular paralyses ; usually the motor oculi (third nerve) is affected, and
there is generally only partial paralysis of the muscles supplied by it ;
but there may be also paralysis of the fourth and sixth pairs in one or
both eyes.

These cases illustrate, also, the frequency with which ataxy com-
mences with an affection of the optic nerve.   According to Marie, ten
to twenty per cent. of the cases of locomotor ataxy suffer from optic
atrophy, and the total duration of its evolution from amaurosis to com-

plete blindness is from two months to seventeen years, the average being three years.

In three of our cases we see that the disease was very rapid in its evolution. In one case (Case III.) eight years have elapsed since the primary symptoms set in, and yet central vision is fairly good.

The mode in which the atrophy precedes spinal symptoms indicates an anatomical independence of the affections. According to Gowers,[1] pathology verifies this conclusion, for in cases in which both posterior columns and optic nerves are affected no anatomical continuity of degeneration can be traced.

In this form of primary gray atrophy the nerve-trunk is usually but little reduced in size. It is gray and gelatinous in appearance. Most authorities consider that this is primarily due to an increase in the connective-tissue trabeculæ coincident with an atrophy of the nerve-fibres. The course of the optic-nerve atrophy is very like that of the cord-degeneration,—it is progressive, and rarely, if ever, tends to recovery. It is important in a slowly developing case to take perimetric tracings of the field of vision, by which valuable aid is obtained in estimating the progress of the case.

Most authorities—viz., Déjérine, Gowers, and Benedict—hold that there is a distinct antagonism between optic atrophy and troubles of motor incoördination. Patients struck with blindness retain for a long time the use of their lower limbs, whereas a tabetic patient may legitimately be told that he will retain his sight to the end of his days, so that in each case a guiding sensation to his muscles will be left to the patient. Either condition is bad enough, but blindness without ataxy and the complications which arise in its later stages—viz., bladder troubles and the miserable bedridden condition which must ensue—is preferable, especially as we see that twelve years, or even more, may elapse before spinal symptoms arise.

We have dealt with the diagnosis and prognosis; we now come to the most unsatisfactory part of our work,—the treatment. After all, this is the most important factor in the patient's mind, and you must begin by telling him that you cannot hope to do very much. I consider that Fournier is right in advising antisyphilitic remedies; for if there is one thing certain in the etiology of disease, it is that locomotor ataxy in the great majority of cases is of syphilitic origin. Why, then, it may be asked, do antisyphilitic remedies do so little good, and, according to some authorities, actually harm? It may be

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[1] Medical Ophthalmoscopy, p. 194.

that patients in most cases do not trouble their doctors until the disease is well advanced and ataxy is pronounced. The warning symptoms, such as "lightning pains," are ascribed to sciatica or rheumatism, the "gastric crises" to biliousness, and the absence of the knee-jerks is unknown. Only when the symptoms produce a profound effect upon the mind of this class of patient, such as "blindness" or "double vision," do they consult the doctor in the earliest stages of the disease, and it may possibly occur to some of you that the early recognition of the nature of the disease, and the prompt application of antisyphilitic remedies in the form of mercury and iodide of potassium, although usually inefficacious in averting the progression of the optic atrophy, may yet preserve the patient from spinal symptoms; whereas, the "absence of the knee-jerk" and the pains, which usually in these cases are either absent or not severe, would certainly not have caused the patients I have shown you to seek treatment if it had not been for their eye affection. We shall put them upon mercurial inunction and large doses of iodide of potassium, with the hope that by this the ataxia may be delayed in its progress or prevented in its appearance. You will, however, be able to watch these patients and follow the progress of the cases.

SYPHILIS OF THE CENTRAL NERVOUS SYSTEM.

CLINICAL LECTURE DELIVERED AT THE NEW YORK POLYCLINIC.

BY B. SACHS, M.D.,

Professor of Diseases of the Mind and Nervous System, New York Polyclinic;
Consulting Neurologist to Mount Sinai Hospital.

GENTLEMEN,—I propose showing to-day three cases that will illustrate a very important affection of the central nervous system. The first patient is the man before you, who is forty-five years of age. He is married; has one boy who is about thirteen years old; and has enjoyed good health with some exceptions. He had severe malaria for thirteen years off and on; he had syphilis eighteen years ago; but he tells us that it was a soft chancre, and there was no trouble following it,—no sore throat, no constitutional symptoms of any kind, and nothing else. He never had any trouble until three years ago. At that time he noticed that when he got up in the morning he felt very weak, this weakness gradually increased, so that after a while he would fall down, and could not run; then he noticed a sensation of pricking in the right hand. Two years ago he first noticed that he would scrape the ground with his toe in walking; after a few months an actual difficulty in walking was developed, there being a tendency to fall if he was not on the watch. There was an inability to run, associated with a stiffness in his legs; in addition to this, he felt a peculiar sensation,—a paræsthesia in the fingers of the right hand and a little in the left. He claims that he never had weakness in the grasp of the right hand. He was somewhat constipated, and had difficulty in micturition. There was no difficulty in swallowing or in speaking, never noticed anything peculiar about the mouth, and had no trouble with his eyes. For five or six years he has had considerable headache, worse at night.

This is the history which you will hear repeated more or less fully in the other cases that I shall show you. The important points are— that he claims that there was no trouble in any of the functions of the cranial nerves, no difficulty in swallowing or speaking, no trouble about the eyes, or of any of the special senses or muscles of the face. So far

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as his statement goes, the cranial nerves are free from any trouble, but on examination we find some peculiarities about him. Looking at the eyes we see that there is a certain inequality of the pupils, rather in favor of the right, but the reaction to light is very prompt ; the same is true for the reaction of accommodation ; so we can say that he has normal pupillary reflexes. As he projects his tongue we see that there is a very marked fibrillary tremor ; that it is deflected a little to one side, and there is a suspicion as if the right half of the tongue was slightly thinner than the left half. This last appearance is not as marked to-day as it has been, but if you take the middle line you will see that there is more substance on the left than on the right. The condition is quite slight here. I call your attention to that little groove on the side of the tongue. This slight depression is worth noticing, and you will see the reason for this later when we come to examine the other cases. There is, however, a marked tremor, and, mind you, it is not the coarse but the fibrillary tremor that is especially important. You notice that when he shows his teeth there is no facial tremor and no paralysis, so we can say that the muscles supplied by the facial nerve are entirely normal. When I ask him to hold his eyes shut, I can open them only with difficulty. When a person has normal control of the eye muscles it is almost impossible for you to open the lids in opposition to his volition. All the cranial nerves are normal, with the exception of the twelfth, which supplies the tongue, and here there is a slight tremor and difference in volume. Now, in addition to the foregoing, we find some other symptoms. I have him hold out his hand, keeping his fingers straight, and you see that there is but a slight tremor. He squeezes my hands with a pretty good grasp, probably a little stronger on the left. He has no troubles of sensation. You notice here the lively reflexes as I tap his wrist. Testing the knee-jerk, we find that there is very marked exaggeration of these reflexes. There is no ankle-clonus, but a very much increased knee-jerk, so that the foot is thrown quite violently from the floor when the tendon is tapped. As he walks, you notice the characteristic gait due to the spastic rigidity of his muscles ; he comes down flat on his foot ; there is but little raising of the toes or heel. To sum up, there is spastic paraplegia of the lower extremities, with a slight involvement of the upper, and increased reflexes in both upper and lower extremities ; furthermore, a slight difficulty in micturition, also a fibrillary tremor of the tongue and a slight atrophy of the tongue. Everything I have not mentioned here you can assume to be negative. I am only showing you the positive symptoms.

CASE II.—Here is an old stand-by of ours. He is forty-four years of age; his history I can give you in a very few words. He was in the liquor business, and imbibed heavily at one time, and was also unfortunate enough to acquire a specific infection ten years ago. In this case there was a hard chancre with all the subsequent symptoms, so that the specific nature cannot be questioned; this man, in spite of his alcoholic habits, had been doing very well until two years ago; and if I ask him for the symptoms during that time you will get a good idea of the trouble, and I wish you would notice the peculiarity in his speech. (The patient, in a thick, indistinct voice, gives the following history.) " The first thing I noticed was a cramp in my tongue; after that there was a prickling sensation in the left hand, and the left hand got so weak that I could not raise it at all." Q. (by the doctor). " How long did it take from the time the numbness began until the hand became useless?" A. " Four months." Q. " About that time, what happened?" A. " It went into my left leg, and I lost power in that, and then could not say what I wanted to." Q. " You could say the words, but they could not be understood?" A. " That is it." So that the man had no aphasia; it was dysarthria, a difficulty of articulation. Next, the trunk muscles were paralyzed, and he could not rise from a bed or from a chair without assistance. Then the right arm and leg became affected.

Here is a man who had distinct specific infection ten years ago, and alcoholic habits a great many years longer. He was well, however, until two years ago, when he first noticed pains with numbness, or a paræsthesia of the left hand; soon thereafter the left hand and arm became useless. Then, about the same time with the changes in the left arm, there was a cramp in the tongue,—a spasm of the tongue, we call it,—and with that increased difficulty of speech, or dysarthria. Next, the left leg became affected, and then the right arm and leg. When he was in that condition of extreme paresis of all four extremities, he came to us a year and a half ago, and on examination before the class I showed that he had distinct spastic paraplegia, rigidity of the muscles, with increase of all the reflexes in both the upper and lower extremities, and an atrophy of and fibrillary tremors in both halves of the tongue,—more marked in the left half; also marked electrical reaction of degeneration in the tongue muscle. There was difficulty of speech, and at one time a difficulty of swallowing. The other cranial nerves were not involved, for he never had any difficulty in the facial muscles, in ocular movements, or with the special senses.

Before making an examination to-day, I wish to say that he came

at the time his symptoms were the very worst.   He is improving now.
The atrophy of the tongue, which was marked at first, is less to-day.
The electrical reaction is nearly normal now, whereas it was altered
when we first saw him.   Furthermore, the spastic paraplegia is very
much improved.   The upper extremities are very nearly normal.   He
never had any difficulty with micturition; as he walks, you would
probably see but very little out of the way.   There are some things,
however, I wish you would notice.   If I were to meet him on the
street now, I would notice this, the manner in which he holds his left
arm.   It is a little out at elbows, and the hand hangs in a peculiar
manner.   It is an abnormal position for the left hand.   This is the
first thing to notice ; then you will probably notice one other thing,—
namely, that he gives more of a kick with the left than with the right
foot.   This may seem a simple matter, but if you had to prove whether
there had been an old hemiplegia or not, you would be glad to have
signs like these.   When I first saw him, he could not get up or down
stairs without assistance, and now there is this marked improvement.
I will show you the other symptoms.   You see that the knee-jerks are
exaggerated, the left being greater than the right.   On the left side
there is a distinct ankle-clonus.   It may be present on the right too,
but is not so distinct.   We have a slight weakness of both legs,—
more marked in the left,—with spastic rigidity.   Testing his grasp, you
see that the left is weaker than the right.   His talk is affected, his
speech being a little thick.   This one test that I show you (tapping
the wrist tendons) is characteristic of all the reflexes of the upper ex-
tremities.   The condition is more marked on the left in the upper
extremities also.   Now comes the tongue, which is the most interesting
feature of his case, and the condition, I beg to remind you, is not as
marked as it was a year ago.   You notice first of all here the same
sort of tremor as in the other case, but more marked.   On the other
hand, here is a very marked atrophy, especially on the left.   It is
shown by a depression.   But this atrophy is gradually disappearing;
yet is distinct enough, as is also a very fine fibrillary tremor.   You
will notice the same combination of spastic paraplegia of the four ex-
tremities, with involvement of the twelfth nerve, which supplies the
muscles of the tongue.   The interesting feature about this case is that
the man was in such a bad state that the prognosis was grave indeed.
We placed him on the most rigid specific treatment, that involved 150
grains of iodide of potassium three times a day for weeks.   The man
improved, in spite of the symptoms pointing to the involvement of the
twelfth nerve and of the medulla; he has nearly gotten well.   The

improvement here is very remarkable. I have compelled him to stop his alcoholic habits, and reduced his flesh a little, so that, although this case was very unfavorable at the beginning, the result of treatment has been most gratifying. We kept him for a while in the hospital, to be sure that he got enough iodide of potassium. With the exception of a slight difficulty in the left side and in speech, the man is almost well.

CASE III.—This is, perhaps, the most interesting case of all. This gentleman is a patient whom I have had occasion to see in private practice, and I urged him, for a reason that you will understand, to come into the private hospital of this institution, and he has expressed his willingness to serve us now. This young man is thirty years of age, and has a rather lively history in the past. Bacchus and Venus were both worshipped a little more assiduously than they ought to have been, and now punishment has come to him rather worse than the poor fellow deserves. There is a distinct history of specific infection. He says that he was eighteen and a half years old when he had the trouble, so it was about twelve years ago. Then he went along very well and did all the work that was required of him until about three years ago, when he became acutely delirious and was sent to Bloomingdale Asylum, where he was kept for ten months, during which time he was practically demented. The prognosis seemed grave, but an improvement set in, and after eighteen months he was taken home. During the time he was at the asylum he developed a peculiar weakness and stiffness in his legs. This increased after his return home, so that at one time he was unable to walk, and even now has great difficulty. In addition to this, he had great difficulty in speech, and a most marked tremor of the tongue, face, and hands.

I saw him for the first time about eighteen months ago, when he presented the following symptoms, most of which are still evident. First, as regards the mental condition. For many months the young man did not care to indulge in conversation ; it was difficult to get him to answer the simplest questions. Now he answers fairly well, although at one time there was considerable dysarthria. He had inequality of the pupils, difficulty of speech, and fibrillary tremors in the hands and feet, with spastic paraplegia of the lower extremities. These symptoms, with the exception of the spastic paraplegia, are similar to those of general paresis. After the first few months of treatment the general symptoms changed very much. There was none of the apathy noticed at one time. He had, of course, difficulty in pronouncing words of many syllables. Yet he talked with his family

and read the daily papers, and ultimately the mental symptoms cleared up. But while this was the case, the other symptoms did not improve as much as we expected them to do. The spastic paraplegia continued. On some days he could walk better than others, till, as you see him now, he has great difficulty in walking alone. He has again become morose; I have great difficulty in getting out of him what I want to know. He is sure that he is not getting well, and he is displeased with himself and his physician. Another physician who saw him thought he was in the deepest form of melancholia. We brought him here the next day, when he brightened up and began talking, and was in anything but a melancholy mood. He exhibited hypochondriacal tendencies, but even these are disappearing.

I lay stress upon the mental symptoms; for they have played an important *rôle* in this case, though absent in the other cases. At first the case made a strong impression of general paresis, and a person seeing the case at its present stage might suspect multiple sclerosis; but we can see that there is no reason for that. Examining other symptoms, we find that the pupils do not react well to light, though they contract during accommodation, so there is Argyll-Robertson pupil. Reaction is present, but it is very slight. When he shows his teeth, you will notice a marked twitching of the facial muscles. These are symptoms seen only in cases of alcoholic paresis or general paresis. He whistles fairly well. In order that you may observe the peculiarity of his speech, I will get him to answer some questions (the patient answers in a thick voice, the words being almost indistinguishable). *Q.* "How do you feel to-day?" *A.* "Very well." *Q.* "Have you seen the papers to-day?" *A.* "I saw the evening papers." *Q.* "What did you read in them?" *A.* "I read about Mayor Grant." *Q.* "What about him?" *A.* "About rapid transit and the Board of Aldermen." (Gentlemen, notice the articulation.) *Q.* "What was Mayor Grant going to do about this?" *A.* "He sent a message." *Q.* "What kind of a message; was it a letter?" *A.* "A message, I guess." I put these questions to show that there is no special defect of intelligence. You will notice that he refers to those things he has seen or read, and he shows that he understands what he reads, whereas a person in an advanced stage of general paresis would not. General paretics sometimes will give you head-lines, but they don't read with understanding. This man is always able to understand what he reads. *Q.* "How old are you?" *A.* "Thirty on the 30th of July." *Q.* "Married?" *A.* "No; don't want." *Q.* "What sort of work have you been doing?" *A.* "Three years in the fancy goods business as

book-keeper : then I had a place in a publishing-house as book-keeper and cashier for one and a half years." You see there was a marked tremor while he was speaking. Now, I will have him write his name on the board. He does this with some difficulty; it is hard for him to finish the latter part of a word. He writes his age, and writes the word Philadelphia with difficulty. There is a very marked resemblance between his writing and that of general paresis. One distinction is that he does not omit letters; but you will notice that there is a marked tremor in the writing, and there is a tendency for him to be in doubt; but it may be that he simply gets discouraged because he has so much difficulty in using his hands. At all events, most people would be willing to accept this as a sign of general paresis, especially the cramped manner of writing Philadelphia. But there is not the omission of letters; there is, however, the characteristic tremor of multiple cerebro-spinal sclerosis. Now you see that he has a spastic walk to a very marked degree. The spasticity of the muscles is so very great that the slightest thing put in his way over which he would stumble would be apt to cause him to fall. Here, in this case, the reflexes are extremely exaggerated, and there is also an increased muscular excitability, so that by simply stroking the quadriceps I can produce a movement resembling a knee-jerk very markedly on the left; on that side, also, there is a very marked ankle-clonus,—the same exists upon the right side; the wrist reflex is more prominent on the right side.

This case presents the same group of symptoms,—the spastic paraplegia of the lower and upper extremities, increase of the knee-jerks, and ankle-clonus more marked on the right than on the left. These symptoms are exactly the same as in the other two cases. The cranial nerves are affected,—namely, the ninth, tenth, and twelfth,—which is shown by the difficulty of speech and swallowing. You notice that the patient has marked tremor of the facial muscles, tongue, and upper extremities, and has inequality of the pupils. Furthermore, what is very characteristic in this case, you will please take note of the mental condition. There was a dementia which was recovered from, and a difficulty of speech which persists. Unless a person observes this kind of a case for several days it is hard to judge it, but you can take my word that there is a marked mental slowness.

This case can be taken as an illustration of specific disease of the central nervous system. In all probability there is a specific infiltration of the brain and cord. At a future clinic I shall bring down such a brain and cord for you to see. There is a thickening of the

pia particularly marked at the emergence of the spinal nerves. This thickening is truly specific; it begins in the meninges and affects the cord; it is not only marked about the cord, but is especially marked at the base of the brain; it is apt to occur in patches, so that we have all varieties of symptoms in one case; there may be involvement of the twelfth, because there is a patch near it, and there may be also such of the ninth and tenth at the same time, or this region may be free; or, again, the thickening may be in the inter-peduncular space, involving the nerves farther forward; this thickening of the meninges is more apt to occur near the lateral or the posterior columns. In the majority of cases it is the lateral columns that are affected, and the symptoms are rigidity and increased reflexes in the upper and lower extremities. We are apt to have spastic paraplegia, associated with involvement of the cranial nerves. If we can conceive of a lepto-meningitis spinalis spreading upward and taking in the nerves at the base of the brain, we have the anatomical substratum for those cases I have shown you to-day. I make the diagnosis of specific disease in cases in which I find spastic paraplegia of the upper and lower extremities, with involvement of the cranial nerves, more particularly where the affected nerves are not contiguous to each other. Thus, in some cases we may have an involvement of the third and sixth nerves, the fourth and fifth being unaffected. In the cases we have had to-day, there was in one spastic paraplegia, with slight involvement of the twelfth; in the second case, besides the involvement of the twelfth, the ninth and tenth were also affected, and that demonstrates to you what I have said, that spastic paraplegia attended with cranial nerve-affection would at once lead you to think of specific affection of the central nervous system, especially if the symptoms are attended by remissions and relapses.

These cases are the ones that, in spite of the severity of the symptoms, are tolerably favorable as regards treatment. I have shown you favorable progress in one case, and I hope to show it to you in others. We must be sure of our diagnosis in order to state the prognosis and regulate the treatment. The latter should consist of a thorough course of specific remedies. Begin with inunctions of mercury (ʒss–ʒi) daily; continue these for a period of thirty days, and if further treatment is necessary, take up the iodides, and give the saturated solution of iodide of sodium, beginning with ten drops t. i. d., and increasing up to seventy-five, one hundred, or even more drops, three times daily, according to the exigencies of the case. I rarely give the "mixed treatment" of old, and prefer to administer the mercurials and iodides at separate periods.

MENTAL DEVELOPMENT AND INSANITY OF CHILDREN.

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GENTLEMEN,—While much has been written upon the insanity of puberty and adolescence, comparatively little attention has been paid to the mental diseases of children. Neither jurists nor alienists have given the subject more than passing mention.

In speaking of insane children, I do not wish to include those who are born with mental defects, and hence are stupid, eccentric, choreic, or epileptic : I refer to those who come into the world in health and continue to develop, both in mind and body, in a physiological way, who are called by parents and friends " bright children ;" who, after the period of first dentition is completed, learn rapidly and attract attention by unusual memory, and at from four to six years of age are able to read and converse " beyond their years." At this stage—from six to twelve years—they become melancholy, stupid, vicious, or actively maniacal.

Insanity in children is almost confined to the United States, and would undoubtedly be classed, along with general paresis, as an American disease by foreign writers. Perhaps because the subject has not been started across the water is the reason it has not received attention here.

The frequency of mental disease occurring in children is undetermined, as no statistical matter has been collected upon this subject. Undoubtedly there is scarcely a school of any size in our cities but an expert would find a number of children in various degrees of mental derangement as well as the primary symptoms of most forms of nervous diseases. The cause is apparent to the physiologist as well as to

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the alienist: it arises from the custom of sending children to school at too early an age, and from that time abandoning their mental and physical culture, delegating the whole matter to teachers; infants from three to five to kindergartens, six to seven to primary schools, just at that time when the preponderance of blood is coursing through a brain which is disproportionately large in comparison with the weight of the body; at a period when a child is impelled by the very nature of its mechanism to keep in almost constant motion its muscular system that by good digestion all tissues may be equally nourished, it is hampered instead by being constrained from one-third to one-half its waking hours to a forced and unnatural sitting posture.   Each thought, each mental endeavor is made at the expense of increased circulation within the brain, which is overfed; hence overwrought brains, impaired digestion, and poorly nourished spinal and muscular systems.

The environment of the infant in the United States is different from that in any other part of the world.   This arises largely from our form of government, which is supposed to be one of equality; one that confers upon each individual the right to make and administer laws, to hold the highest offices, and to acquire wealth.   The possession of the latter is the greatest desideratum from the most humble to the highest; satisfaction is rare in any class.   The child is born into a hurried life; bright lights, noises, and confusion surround it; one might say it enters social life from the hour of its birth.   Ere it has been weaned from the breast—or bottle "in the best society"—it sits at the same table, partakes of the same food, and is subject to the same surroundings as the parent.   As a rule, the American father and mother of the so-called laboring class are not only seeking to add to their labor the accumulation of wealth, but society obligations also, and desire that their children should have an easy life, free from care, with abundant wealth and social distinction.   From such causes American children develop forms of neurosis by which these inbred errors are apt to crop out in the third or fourth generation as mental monstrosities, eccentrics, neurasthenic cranks, insane epileptics, and idiots.

To better understand the child mind in disease let us briefly consider its physiological development from birth until language is used to express ideas.   We must do this in order to understand those deflections from mental health which produce delusions, hallucinations, and uncontrolled impulses of childhood.   As I have said, a child is born with a disproportionately large head; its brain is larger than that of any other animal in proportion to its body, and its brain at the birth-period is less perfect, having no function whatever; the only

motion the child is capable of making is of a reflex character from the spinal cord, the same motions would be made were the child born, as is sometimes the case, without brains; it sees no form, distinguishes no sound, receives no impression at first through the special senses.

The first sensation of the infant is that of hunger, which, as a rule, is not manifest for two or three days, although the reflex act of moving the lips and tongue as in sucking will take place when any object is placed in the mouth, tasteless or otherwise; but within a few days the special sense of taste is developed enough to make a record upon the sensorium, and the source of satisfaction of the appetite is again sought by irregular motions of the head and lips; thus the first act of will is performed proceeding from unconscious memory of taste. Next, the sense of touch causes the infant fingers to grasp or press the soft warm breast, and as the body has commenced to grow from its new nourishment, the almost shapeless mass of brain begins to develop into lobules, —distinct regional markings, each region having some special power or function,—the growing cortex begins to crowd the cranial cavity, folding itself into space-saving convolutions; the gray cell masses that give force and co-ordinate power buried in the centres of the brain increase in size and assume their intended activity. At this period of the perfecting process the eye begins to discern light from darkness; it is attracted by the light, and, as it grows older, the shadows that intervene take form; these forms, which at first are but images upon the eye and meaningless, soon are conveyed to the back part of the brain and there imprinted forever; the sight of the source of food, whether maternal breast, bottle, cup, or spoon, is thus associated with stomach satisfaction and with taste. Taste, touch, and sight are thus the first senses which begin their functional activity in harmony. All of them have their special organs, so to speak, or place of action and reaction in parts of the brain set aside for a purpose. It might be likened to a garden in which you have a bed of pansies, a bed of tulips, one of forget-me-nots, etc.

After taste, touch, and sight have developed, the motor-centres assume activity; the infant, now inspired by the hunger sense, sees the image of the object which relieves that hunger within the brain-centre; where objects are imprinted its memory of the taste of food is aroused; both these connect with the motor-centre, and the hand is outstretched to grasp the object which is wanted. Ideas and motion are now established, but all are imperfect acts and concepts until years have perfected the brain mechanism. Sound next becomes an organized appreciation through the ear to the hearing centre; a word oft-repeated

makes a memory impression and awakens association; thus, the mother feeds the child from a cup,—water, milk, tea, bread and milk, etc.,— saying, "Baby drink; baby want drink?" holding the cup before it. In time there is an association of the sound in the hearing centre with the cup and contents on the visual centre; these send a message to the motor-centre, which causes ideo-motor action (to grasp the cup and satisfy the hunger and thirst); not only these, but the speech-centre is awaking and the infant moves the tongue conjointly with the vocal cords in the attempt to imitate the sound that conveys the meaning to it of drink, usually "d'nk" or "dink," a vocabulary which, limited as it is, answers to express its one great necessity and want,—food and drink.

The human infant at six months does not know as much as a pig or a lamb at six days, and in two years has not the physical ability to care for itself that a chick has at two minutes after leaving the shell.

Without the ability to express there is no thought. To the most perfect mind speech, facial movement, eye motions, and gesture conjoin to convey our thought; to the one bereft of hearing from infancy there is but limited expression; to one both blind and deaf from infancy the soul is dim indeed; they only copy expressions from years of laborious teaching, just as the trick-horse or dog for exhibition is taught, their knowledge having about as much relation to sense as the talk of a parrot—who either prays or blasphemes—has to theology.

The child at from two to three years of age increases its knowledge by practising motion and receiving impressions through the special senses; at the same time, the circulation in the whole brain-mass is increased by the growth in size and number of the blood-vessels; the quality and quantity of the blood are in proportion to the character of the food and the powers of digestion, the latter influenced by the amount of exercise taken. The weight of the brain at twelve is nearly what it will be at twenty years of age.

The child at five to seven years old has received much, but has not elaborated much thought outside of the satisfaction of its living for what pleases its senses. No matter how intelligent ("smart") the child may be at ten or twelve, the man or woman who would think or act or express itself the same as a child would be regarded as insane; it is because the child has developed memory alone and drawn but few conclusions from its meagre concepts of thought; reason, judgment, and will-power are too imperfect, self-denial except by the severe discipline of necessity or instruction is almost unknown, the various things that have been impressed through the special senses upon the sensorium are vivid and clear-cut pictures; its emotions are intense,

its affection for a toy or a pet frequently equals the love for parents and friends, things of no value are priceless to the child; too seldom we remember that the child does not possess all the qualities of the man or woman. The fault of our system is, that it should strive to make them adults in mind when there are yet years of infancy before them.

As I have intimated, the child lives in pictures of the brain. If fairy stories have been its intellectual food, every image in the receptacle of sensory impressions is aroused, mind-pictures weave themselves into panorama, the things told are real to the infant mind; in its dreams it sees the suggestive; its fancies during waking hours may become intense as the accelerated heart rebounds to the imagination, and exciting quantities of blood course through the localities of indelibly printed objects; hence it is that nearly all children exaggerate, tell lies, and appropriate that which is not theirs, until time and patient instruction have developed reason, judgment, and will.

The brain of a child at birth may be likened to a great white scroll upon which it writes its life's history each day. At first a few simple sounds, with meaning, however, as " pa pa," " ma ma," " dink," " cup," in large characters markedly separated in lines wide apart; as intelligence increases words are connected, then sentences formed, but the record is not tinged by the prolixities of composition until combinations are formed from recollection; continuing along in years and increase of wisdom the words and lines are more closely written, with much imagery and useless phrase, until adult life, when there is an overcrowding on the page, and from thence on there is many a blot, erasure, correction, and interlining, until at last, in old age, it becomes a tear-blurred, crumpled, and faded manuscript, illegible except in spots.

It is no wonder, then, that in some sensitive children, particularly those with the inherited tendencies I have referred to, the brain mechanism becomes so irritated from disease or injudicious application to artificial instruction from books that their thoughts become exaggerated, their mind composition inflamed, and their acts, from false perceptions, uncontrolled.

As I said in the beginning, every form of insanity may be portrayed in the child from seven to sixteen years of age. It may be the mildest form of paranoia, evinced by egotism, jealousy, and suspicion, melancholy, religious enthusiasm, or wild and destructive delirium. Joan of Arc, at the age of thirteen, begins to have aural delusions, which lead her, in her deeply superstitious nature, to translate the sounds, which to the pathologist would mean disease of the internal

ear, into voices from the "spirit world," and, finally, to the command-
ing voice of the Deity.   By her appearance, her insane boldness, her
suggestive influence gathered armies, and in her hands held the desti-
nies of France.   Hallam, in his "Europe During the Middle Ages,"
gives another instance of insane religious enthusiasm.   A French boy,
a mere child, afflicted with religious enthusiasm, preached the Crusade,
and soon with a "multitude of some say ninety thousand children set
out for the Holy Land.   They came for the most part from Germany,
and reached Genoa without harm ; but, finding there an obstacle which
their imperfect knowledge of geography had not anticipated, they soon
dispersed in various directions.   Thirty thousand arrived at Mar-
seilles, where part were murdered, part probably starved, and the rest
sold to the Saracens."   The advent of such a child would make no
ripple upon the current of nineteenth-century thought.

History has recorded but few of these cases of juvenile insanity.
Only the most remarkable have reached the public, and those noted
by the newspapers.   I have known children of five and six years to
become morbidly depressed, moan, and cry for hours ; mutter and
scream in sleep because the terrors of hell had been so strongly pic-
tured to them by the parent (who had endowed them with supersensi-
tiveness) as a punishment for telling a falsehood (due to diseased im-
agination), or for the breaking of a window or other trivial accident.
Sometimes such children are scared into acute inflammations which
forever mar the brain structures.

It is the supersensitive child that is at all times in the greatest
danger ; they are excited too easily ; they take crying fits without
known or with but imaginary provocation.   Such children should be
watched.   Of such, Clouston, in his work, "Mental Disease," page
121, says, "Their brains should not be forced in any way ; they should
be much in the fresh air ; they should not read much imaginative liter-
ature" (I would say none) ; "they should sleep much.   Public school
life is often most detrimental to them ; they should not be bullied or
frightened.   The modern systems of cramming and competitive ex-
aminations are the most potent devices of the Evil One yet found out
for the destruction of their chances for happiness in life.   Such chil-
dren are often over-sensitive, over-imaginative, and too fearful to be
physiologically truthful ; tend under fostering to be too religious, pre-
cociously intellectual, and hyperæsthetically conscientious.   Such chil-
dren should be taught to systematize their time and their lives, to
develop their fat and muscle, and lead calm lives of regular. orderly
occupation."

One would suppose that the supersensitive child would be the least liable to suicidal mania or impulse. I recall four cases occurring in Indiana within as many years, and others may have escaped my attention : one, nine years of age, hanged himself because he was not permitted to go to a show ; one, aged eleven, because of an unjust punishment ; another, age not given, because another boy got the best of him in a fight about a girl, the fight occurring in her presence,—he shot himself; the fourth drowned himself because he thought his parents did not love him. The last three were not of the impulsive type of suicides, but followed after several days of melancholy.

In France about two per cent. of the suicides are children from five to twelve years of age. I have known many cases of deep and protracted melancholy in children, but I cannot remember one of them as being illiterate. Children who are engaged in manual labor— on farms or in shops—are the least liable to melancholy or any form of insanity. Those who are constantly in school, on the one hand, or idle during vacation, having unlimited freedom to the fiction of the day in newspapers or cheap novels of the exciting and wicked type, are the ones who suffer most from excitements beyond their control.

Hundreds of boys in the United States, from eight to fifteen years of age, desert their homes every year with desire for adventure, usually to fight Indians, to become hunters, bandits, detectives, or pirates, from over-stimulated imagination induced by bad literature and indolence. I venture it as an individual opinion that there are not half a dozen newspapers in the United States but what contain matter of a kind unfit to put into the hands of bright, sensitive children. The religious press either imbues them with religious melancholy or converts them into sentimental frauds,—frauds without knowing it, frauds upon their own nature. There are few adults who cannot look back with amusement or disgust upon the days of childhood when they were affected to melancholy, hypocrisy, cruelty, to lying, and various adventures and romances through the teachings of unwise persons, the conversations of those about them, and exciting books and papers. In illustration of what I have said I will relate a few cases, not in detail, but the main features.

Case I.—A child, aged five, whose parents frequently frightened her by telling of a black hole where witches and hobgoblins abide to punish bad children, having been disobedient, was threatened with being shut up in a dark closet. She immediately became cold, quiet. and ghastly pale, trembled, and sank down ; she was put to bed and for months muttered and raved about all she had ever heard of unreal

things; then recovered, but with a nature changed,—the sunlight had gone out of her life.

CASE II.—A bright, active boy, aged nine, of nervous temperament, during three years of his school-life, had been the pride and pet of his teachers; he not only had his lessons, but read everything in sight as well. One evening, playing with a little terrier, the dog bit him upon the hand,—a mere scratch, which soon healed up. The following week he read in the evening paper about a case of hydrophobia in a boy about nine years of age, which had developed some weeks after the bite had been forgotten. The paper gave with minuteness all the actions of the patient; how he frothed at the mouth, barked like a dog, was convulsed at sight of water, etc. Now, the strong impression made upon the sensitive mind of this imaginative boy by the similarity of the circumstances caused him to follow the suggestive story in self-application. He did all that the paper related of the other boy's doing. I was called in consultation in the case, and found the lad of handsome, clear-cut features, lying upon the lounge. His frame was very slight compared with his head. He talked freely in a cheerful manner about the attacks; knew when they were coming on, but could not resist them. The cheerfulness of the child was in sad contrast to the anxious father, tearful mother and sisters, and excited neighbors; for the case had been growing worse for ten days. I learned that the attacks came on about 12.30 P.M. and 6.30 P.M., the time when his sisters, father, and neighbors were sure to be at home. It was twelve o'clock when my visit was made. The family physician and myself had retired to an adjoining room to talk over the case when we heard the screams of the family. Opening the door, we found each member perched upon chair, table, or bed, the neighbors crowding the windows, while the lad, with glaring eyes, dilated pupils, and frothing mouth ran about on all fours, barking and biting at the table-legs. "Don't come in, doctor; shut the door!" the father shouted; "he will bite you." "We want him to come in and bite us," was the reply. The boy rushed into the room where we were as sprightly as a dog could have done, and we locked him in with us. "We will let him alone, doctor, until the fit wears off. In the mean time, if he tries to bite us, kick him right in the mouth and face,"—this said in a loud, clear voice quite plain to the patient. The doctor and myself continued our conversation. The boy, after hiding for a time under a sofa in the corner panting and barking, soon came out cheerful and well; the pupils had contracted normally, the face was pale and the pulse quick. The treatment prescribed was solitary confinement in a dark, well-

ventilated room ; absolutely no one was to see and converse with him ; his food to be given him in silence, and to consist of bread and milk and water. The attack returned but once,—the following day. For months the boy was nervous, but there were no symptoms of hydrophobia.

CASE III.—This case is one which, I fear, is not so uncommon as we might at first suppose. A girl of thirteen, whose mother died some four years before, and whose father, a poor man, who, like many of his class, desired his daughter to have advantages and position beyond her parents, sent her during the winter to the city to school and to take music lessons. Unfortunately, he had little means of knowing the people she would associate with, and she did about as she pleased ; read silly romances and all the bad real and imaginary trash of the daily papers. Her beauty and brightness made her a favorite with the fast young men and girls at school. When she returned to her home for vacation she became melancholy, refused to work, demanded money for dress, and was morose when it was refused. She would stay in bed much of the time seemingly half conscious, and after a month or two told one of her neighbor women that her own father had seduced her, and that she was now *enciente*. The whole population was soon aroused, and the father barely escaped lynching by being guarded in jail. At the trial the girl swore to the imagined facts, and upon it her father was sent to the State prison for ten years. The girl was put under the guardianship of a dishonest and capable man, and in four years all the property was wasted ; then the girl began to awaken to a real life, and corrected the delusion which had long possessed her. Her father, in the mean time, had so grieved over the trouble and false imprisonment as to become insane (showing the neurotic tendency) and had been committed to the Central Hospital for Insane, from which I discharged him.

CASE IV.—A boy, aged fifteen, light hair, blue eyes, large head, slight frame ; at his home had been regarded as the "good boy" of a large family and was the pride of the Sunday-school ; won a prize for good conduct and standing in studies at the public school ; a constant reader of everything. He did go hunting, fishing, and nutting, as other boys did, but he suddenly changed ; did not read at all, but began to talk a great deal about himself (in fact, he talked and thought of no one else) ; he swore volubly and ingeniously, smoked cigarettes moderately, but boasted of smoking eight or ten packages per day ; boasted of his capacity for beer and whiskey, his great winnings at cards and horse-races, his fights, murders, and hair-breadth escapes, all of which were delusions. He believed also that he was a detective, and

actually tried to arrest men on the street. He was suspicious of every one, and only after months of confinement to certain hygienic rules of exercise and diet did these delusions pass from him.

CASE V.—A lad of ten; neurotic parentage; brought up tenderly; read himself into juvenile mania, when he imagined himself an Indian. He could not be controlled; fought his parents, hid in the barn, and shot at them with arrows; wandered in the woods at night; had convulsive attacks frequently, but lacked the elements of true epilepsy. Cured by change of environment and active hygienic treatment, static electricity, and discipline.

CASE VI.—A lad of eight had read of wonderful sleepers; that they attracted great attention and puzzled all the medical profession; so he continued to sleep for several weeks, only waking to take food. The excitement he created stimulated his delusion, which continued until all the doctors had given up the case and the people far and near had satisfied their curiosity. His egoism was no longer fed and he recovered.

Such are a few of the many cases that might be recalled. They are insanities of imitation, and exist in greater or less degree in a large number of children. There are other insanities produced in children following wounds or blows upon the head or spine, and others still that follow pneumonia, rheumatism, and enteric fever.

When so many children have the neurotic tendency by inheritance, and so many are made neurotic by a cultivation called education, we only wonder that so many can react in after years and correct those delusions that once beset them. We wonder, too, that children of this temperament are not more honestly taught at home the great principles of practical and useful knowledge and physical industry, instead of being turned over in their infancy to so-called trained teachers who have long forgotten that they were once children, and that the greatest laws of physiological development and pathological change will prevail over all theoretical forms of instruction.

Since writing the above I have been called to see a case of simulated canine madness almost precisely similar to that given as Case II., except that in the latter case it was in the brother of the boy who was bitten, who became affected, after the lapse of two weeks, with every symptom of acute hydrophobia. The same line of treatment brought about a complete cure.

TWO CASES OF PSEUDO-HYPERTROPHIC PARALYSIS IN BROTHERS.

BY ARCHIBALD CHURCH, M.D.,

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GENTLEMEN,—To-day I have the opportunity of presenting two typical and interesting cases of a very rare disease. This older boy, eight and a half years of age, as he walks about presents marked incoördination in gait, with clumsiness depicted in every movement, and there is some lack of intellectual brightness in his facial appearance, which is confirmed by the fact that he does not get along well at school. Upon removing his clothing we find the most notable feature to be a disproportion in the lower extremities. While the calves are very large, firm, and apparently over-developed, the thighs, in comparison, are very much below the proper proportion. As I turn him around you will notice an antero-posterior curvature of the spine, giving a sway-back appearance. (Fig. 1.) There is also an apparent and real protrusion of both scapulæ, because the infraspinatus muscles are so much enlarged that they feel like fatty tumors, and a weakness of the serratus allows the scapulæ to stand out from the thorax. The deltoids are also somewhat puffy. The muscles below the elbow and the small muscles of the hand show no deviation from the normal proportion, nor do those of the feet.

If I now ask him to advance the foot and place it upon a chair, he is absolutely unable to do so, thereby demonstrating great weakness in the flexors of the thigh, the psoas group, and the extensors of the leg. Going up-stairs is thus rendered very difficult. If I ask him to stoop, he is unable by the action of the extensors of the thigh to erect the body and to bring the pelvis to a vertical position over the heads of the

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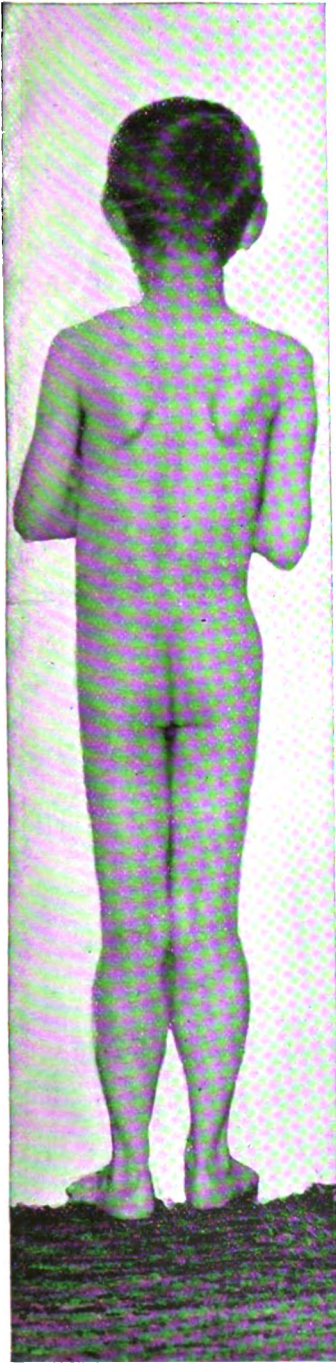
FIG. 2.—Winging of the scapulæ and over-development of the calves in a second case of pseudo-hypertrophic paralysis in the same family.
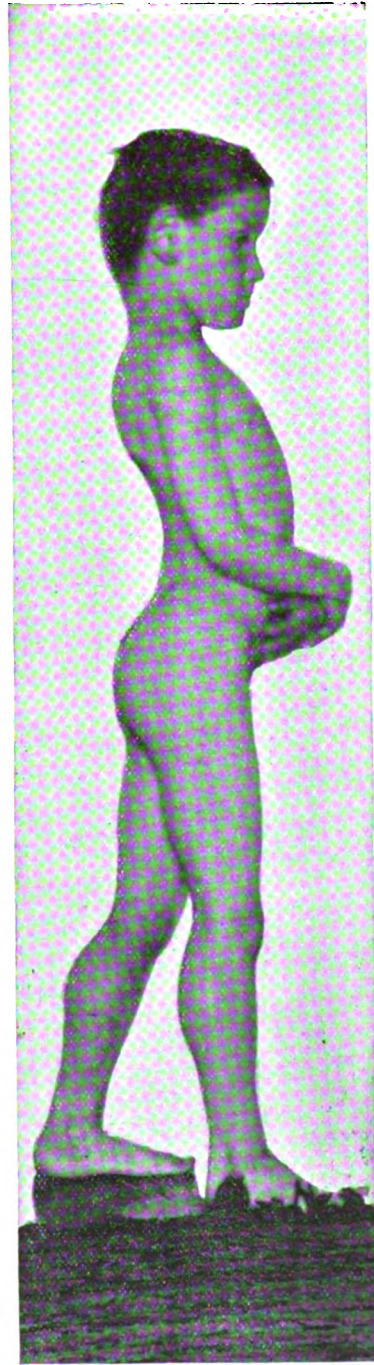
FIG. 1.—Antero-posterior curvature of the spine in a case of pseudo-hypertrophic paralysis. The calves are enlarged as well as the scapular muscles, while the extensors of the back are weakened.

femora, showing a weakness of the gluteal muscles. This inability to maintain the pelvis upon the heads of the thigh-bones results in the sway-back position to which your attention is called, and this in turn is aggravated by a weakness in the erectors of the spine, as is shown by the fact that when sitting for any length of time he complains of pain in the back, and has a tendency to support the upper portion of the body by resting his elbows on the knees,—a position which his parents describe as characteristic of him,—and by difficulty in rising from the floor, as will be presently demonstrated. In attempting to flex the foot upon the leg, the enlarged calf-muscles appear somewhat contracted, and prevent the dorsal flexion of the foot; this is also increased by weakness of the anterior tibial muscles.

When I now attempt to excite these muscles by electricity, whether it be the enlarged sural muscles or the diminished thigh-muscles, you will notice that it requires a very much stronger current both through the faradic coil and by the galvanic method than is required in health. Indeed, such a severe current is requisite that it is practically intolerable, and only results in very feeble responses. These responses, however, appear in the order in which we find them in healthy muscles, and, consequently, they present nothing of the formula of degeneration. It is merely a quantitative change. The knee reflexes are abolished, and the skin reflexes are diminished. The tendon reflexes of the upper extremities are so greatly diminished as to leave doubt whether they are present.

In the various tests I am making regarding his sensation, I find no departure from the normal as to recognition of degrees of heat. Pain, pressure, and contact are fairly recognized, but there is a loss of muscular sense apparently, as shown in the incoördination,—though this, perhaps, is but apparent, as the varied strength of the muscles may conduce to it rather than any true sensory difficulty.

The boy in rising from the floor presents a series of movements which are well-nigh pathognomonic of the malady. Owing to the weakness of the muscles about the hips and the vastus muscles of the thighs, which extend the legs, rising without the assistance of his hands is a physical impossibility. He, therefore, first huddles himself together on the floor, and, getting on his knees and hands, pushes his body forward, gradually rising upon his feet in a position of all-fours, the weight of the shoulders and of the head being carried entirely upon the arms. The task now imposed upon the lower extremities is reduced to a minimum, and he is able to thrust up the lower portion of the body something in the manner in which a cow gets up, by the

hind quarters. Moving his hands in the direction of his feet, he grasps himself above the knee with one hand, the other still resting on the floor with the arm as a supporting column, straightens out the knee-joint, and pushes the upper portion of the body into an erect attitude by a hand-over-hand process. The curvature of the spine suddenly develops, and the weight of the body is thrown entirely upon the ligamentous structures of the hip-joints and the vertebral articulations, where a minimum of muscular force is required to maintain it. You will also notice the unusual mobility in the scapular attachment to the thorax, already pointed out as due to a weakness of the serratus magnus. This is customary, and impairs the strength of all the muscles attached to the shoulder-girdle, so that while the hand-grasp and the power at the elbow are fair, movements dependent upon the strength of the shoulder-muscles are much weakened. There are no rectal or bladder symptoms, and the processes of nutrition and assimilation are actively performed.

The second boy, one year younger, presents, practically, the same conditions, though slightly less marked. (Fig. 2.) His stature is greater than that of his elder brother by an inch and a half. The size of the calves is not so greatly exaggerated, the winging out of the scapulæ is nearly as pronounced, but the weakness in the various groups of muscles indicated in the older boy, while here clearly present, is less in degree.

Taking now into consideration the meagre family history of the patients, we find only one significant feature,—a maternal uncle became . more or less helpless in his childhood at about the age of six or seven, and died completely helpless at the age of fourteen. On the father's side there is nothing to note except asthma in a sister. The parents, of foreign birth, are in perfect physical health, and both children were born by natural labors, somewhat protracted, to be sure, but not otherwise marked by any difficulty. The oldest boy at the age of six months had some febrile disturbance, and for several weeks repeated convulsions took place of a generalized character, as many as six or seven in a day. From that time weakness, marked by inability to sit up and hold the head erect, was noticed. He did not learn to walk until nearly three years of age, and has always walked awkwardly. Speech and mentality were also retarded.

The second child at the age of one year presented a somewhat similar febrile disturbance to that of the elder brother, which in like manner was followed by convulsions for a few days. His ability to walk, which at no time previously was very great, was considerably

diminished at that time. A younger sister two or three years of age is a perfectly normal child.

If we were able to excise a portion of these enlarged muscles, under the microscope we should in all probability find that there was a considerable thickening of the fibrous material, an immense deposit of interstitial fat, considerable wasting of muscular elements, and certain individual muscular fibres probably much enlarged. In the shrunken muscles of the thighs, or the serratus magnus, we would find a similar hyperplasia of connective tissue, and a wasting or complete disappearance of the sarcode elements. In both the enlarged and shrunken muscles, therefore, the common character of fibrous proliferation would be present. The fat is an adventitious item, and these muscles enlarged by the fat deposit, and to a very slight degree, if at all, by actual hypertrophy of the muscle fibres, will eventually become shrunken also, and then present conditions absolutely similar to the muscles which originally waste.

By analogy with spinal progressive muscular atrophy, for a considerable period this form of hereditary disease was attributed to lesions of the cord, particularly of the gray matter of the anterior horns. Somewhat numerous autopsies, however, by competent observers, have resulted in finding this portion of the cord, and, indeed, all portions of the cord, absolutely intact, and it is likely that the cord changes reported in various places are resultant rather than causal of the disease, as it is a well-known fact that disease, amputation, or disuse of an extremity causes changes of a somewhat dystrophic character in the corresponding spinal gray matter. The idea, therefore, became widely entertained that this is a disease primarily of the muscles, apparently for the principal reason that no uniform and sufficient cord changes are found. In recent investigations of the nerve-endings in the muscles of pseudo-hypertrophic paralysis, and an allied, if not identical, disease, juvenile muscular atrophy, Von Babes finds the nerve-plates altered in two ways: first, they are rudimentary or undeveloped, and, secondly, they are actually degenerated. I cannot, however, disabuse my mind of the impression that some disturbance of the trophic control of the anterior horns of the cord over the corresponding nervous and muscular periphery may be sufficient to set up the changes which we find in the muscles. The nutrition of these muscles is physiologically and manifestly dependent upon the integrity of the anterior horn. It is not, it seems to me, unreasonable to suppose that certain changes in the anterior gray matter, of a nutritional or dynamic character not susceptible of demonstration by our present means of investigation, may be the

primary cause of the disease. The fact that in a given individual certain muscles waste while other muscles hypertrophy, or at least are filled with fat and present the appearance of hypertrophy, shows that the nutritional element varies in the given individual, and this variation must be dependent upon central disturbance.

From the fact that it appears almost invariably in the periods of childhood marked by active growth, its developmental character and the indications of an inherent deficiency are manifest. Although less likely to take place in girls, when it does appear it usually occurs at puberty, another developmental period, or later during adolescence. This relation to development, coupled with the fact that the majority of these cases are of a family type, and have a tendency to appear in successive generations, at once points emphatically to the elementary and embryological conditions in the field. We are reminded of hereditary ataxia or Friedreich's disease, another hereditary and developmental malady. Both of them appear in successive generations, both have a tendency to be transmitted by the female line, both make their appearance at developmental periods of life or after infectious diseases, and both of them present the indication of a primordially defective nervous apparatus which suffices for a time, but under the rapidly-increasing demands of active growth or exhausting disease fails to respond satisfactorily, and subsequently degenerates. In hereditary ataxia the spinal cord is defective; in pseudo-hypertrophy perhaps it is the peripheral nerve-endings, or it may be the spinal gray matter which dominates them.

The disease is propagated through the female side of the family,—first, because it is more frequent among boys, resulting in their impotence or early death; second, because it appears at a much later age in women, and does not of itself preclude fecundity; and, third, because apparently healthy mothers often have brothers and children similarly affected, themselves escaping. So pronounced is this factor in these cases that it has been traced through four or five generations by various observers, and one of the instances recorded by Meryon, in 1852, presented eight male cases in one family, none of the many sisters being afflicted.

Regarding treatment, I am compelled to say that up to this time all forms of medical management have resulted practically in failure. Nothing has served to stop the onward course and natural evolution of the disease, and its progressive tendency to complete helplessness and death by intercurrent maladies. Gowers, who has, perhaps, made the most valuable contributions to our knowledge of the malady, and whose writings, taken with those of Duchenne, in 1861, practically cover the

entire ground, and have received but trifling additions from other sources, insists strongly upon the use of exercises for the defective muscles. Disuse of the weakened muscles rapidly increases their wasting. The application of braces and jackets for the distorted spine would, therefore, be detrimental ; but gentle exercises—gentle, because the muscles are already greatly weakened and must not be overtaxed— may serve to build up the individual strength of these muscle groups to their highest attainable limit, thereby prolonging activity, and, consequently, retarding the progress of the disease. Massage is also a most admirable measure if intelligently applied. The massage of the hypertrophied, tense, and sometimes over-active muscles is of less value; it should be mainly directed to those that are weakened, and where the antagonism of stronger muscles is inclined to overbalance them. Unfortunately, many of the muscles from pelvis to thigh are not within the reach of these manipulations. As a general measure for the improvement of the functions of nutrition, massage also has a certain value. Of electricity I speak with hesitation, because in these cases ordinarily such a painful current is requisite to secure any muscular activity that it is insupportable. Where, however, muscular contractions can be secured by the use of faradism or galvanism, I should consider it wise to insist upon its use.

From what has been said, it may be gathered that the prognosis is absolutely unfavorable. Though not *per se* lethal, the incidence of any serious or acute affection is likely to be fatal. The patient becomes progressively more helpless, the atrophy progressively more accentuated. The progress is perhaps slower in girls. Sometimes, after a comparatively lengthy stationary period, the disease rapidly grows worse. Rarely an age of forty years is attained ; most cases die between twenty and thirty.

Fortunately, the disease is not a painful one, very little suffering aside from disability is associated with it, and, therefore, the task many times is reduced to maintaining these unfortunate mortals in as comfortable a condition as possible down the declining pathway which their disease leads them to its fatal termination.

CEREBRAL MENINGITIS; CONCUSSION OF THE BRAIN; SCIATICA; TWO CASES OF CHOREA.

BY DANIEL R. BROWER, M.D.,

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CEREBRAL MENINGITIS.

LADIES AND GENTLEMEN,—Some of the class may recognize this patient as having been presented here a week ago, being then in a comatose condition, from which we did not succeed in rousing him before the class; his position in bed was with the head retracted upon the back. He has now regained consciousness. This case of cerebral meningitis has made an excellent recovery up to this point, but if we were to examine critically into his mental condition, it would be found greatly in error concerning many matters of memory. He has been in the hospital about two weeks, instead of four months, as he says. The man is, however, making an excellent recovery. His treatment was potassium bromide combined with a sufficient quantity of opiate to quiet the wild delirium and the restlessness which had characterized his case from the beginning. Since the active condition has passed away and the inflammation subsided, simply the exudation remains. His treatment now consists in the administration of potassium iodide, and I think it is important to give it to these patients liberally. As a secondary consequence of meningitis resulting from the presence of the exudate, we have disturbance of the motor or other territories of the brain, sometimes with paralysis of one member, sometimes headache, sometimes epileptic convulsions. An effort must therefore be made to remove this product of inflammation as far as possible, and potassium iodide and mercury are the remedies by which this result can best be attained. The man is now in a very good general condition, and ought to be able to take the iodide in good-sized doses; I think the only limit

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to its use is the toleration of the patient: if it produces very much coryza or brings on headache, the administration should be reduced, but for the next ten days the drug should be pushed as much as possible without disturbing his general nutrition. After this treatment has been pursued for ten days I think he should have tonics, strychnine, iron, and quinine, but not at present; if we should give these now in sufficient doses to make an impression upon the nervous system, we would be very apt to bring back this meningitis. But later, when the exudative products are removed, tonics should be given in full doses, thereby favoring a result that is not always obtained,—that of perfect restoration. As we have before remarked, meningitis usually leaves behind a legacy of persistent headaches, convulsive seizures, or some other malady, but I shall be surprised if this young man does not recover perfectly.

Some of the class will remember the negro who was before you two weeks ago with diffused general myelitis. Dr. Cutler has succeeded in getting the spinal cord, and has it here for your examination. This case was especially interesting because of its peculiarities. I think the exceptions in medicine are often instructive. The disease in this case, as you recollect, began in the motor territories controlling the upper extremities. The first symptom he had was a loss of power in one hand, followed by wasting of its muscles; then the other, hand became similarly affected. The disease was limited for a week or two to the motor territories; then the inflammation became general in the lumbar enlargement. When the patient was before the class he was paraplegic, having loss of sensation and loss of power in both legs, and loss of power in both arms. The anæsthetic zone extended to just above the nipple, there being above this a territory of hyperæsthesia. The disease continued to progress until the centres of respiration in the medulla became involved, when the man died suddenly.

CONCUSSION OF THE BRAIN.

CASE II.—Here is a case that is something of a mystery.

History.—This man, thirty years of age, a stone-mason, while at work on the morning of the 16th was accidentally injured by a four-pound sledge-hammer, which flew off the handle and struck him on the left frontal prominence. He did not entirely lose consciousness, and after resting an hour or two went back to work. The next morning, February 17, he was admitted to the hospital in a somewhat comatose condition, no paralysis or anæsthesia apparent. On the 18th he was entirely rational, complaining only of a severe pain across the small of

the back, which had troubled him for some weeks. His temperature was 102.2° F., pulse 110, respiration 22, when he came into the hospital. The next morning he was feeling all right; temperature 98.8° F.; the next night, 96° F.; the next morning, 97.8° F.; in the afternoon, 100.4° F. On the morning of the 19th he had an attack of nausea, vomiting, and headache, and complained of severe pain in the neck and abdomen, the temperature reaching 104° F.; in the afternoon it sank to normal. On the afternoon of the 21st the temperature rose to 104.4° F.; on the next afternoon to 104.6° F. March 1, at 8 A.M. it was 97.6° F.; in the afternoon, 102.8° F. The pulse corresponded with the temperature, ranging from 68 to 106. That night his temperature was 97.6° F.; the next morning 98.2° F. On the 3d of this month, at 8 A.M., his temperature was normal, and he was feeling well; that afternoon it rose to 106° F. Yesterday the temperature was 100.6° F.; to-day he has been feeling first-rate, but now complains of pain in the head. His temperature at noon was 99.2° F. He has frequently suffered from nausea since the first attack.

This man has received a very severe injury, and the only surprising thing about it is that he is still alive and before us to-day. Almost any one receiving such a blow would not have recovered from the immediate effects. There was some mental concussion at the time of the accident, but the features of most interest to us are the very peculiar symptoms that have subsequently arisen. There is nothing immediately beneath the seat of the injury the disturbance of which would account for such a succession of varying temperatures. These variations have occurred without the least regularity. As a cause of this remarkable disorder, something has very seriously disturbed the temperature-regulating centre, and the same is probably true of that which controls respiration. Upon close inspection of this man I have on several occasions observed that interesting and somewhat rare anomaly, the Cheyne-Stokes respiration. As characteristic of this the patient will take deep breaths for several successive inspiratory acts, following which the respirations become more rapid and shallow until they cease altogether and are suspended for a number of seconds. From this point they gradually return, becoming deeper and more intense till the normal is reached. This series is repeated several times. The pulse is feeble; at this moment it is very small, easily compressed, and certainly not over 60 or 65. A careful examination of the chart will show a very frequent want of harmony between the pulse, respiration, and temperature. Now, these are all regulated by centres located in the medulla, and I am of the opinion that the pathogenesis of the

peculiar symptoms in this case is to be worked out by a study of the functions of the medulla. The force of that blow must in some way have disturbed the functions of the medulla, whether by producing a slight hemorrhage there, causing irritation, or simply by the concussion of the medulla, is a question. The contre-coup, I think, is what produced the symptoms, and not the direct blow, although it is possible there may be some meningitis. When he has not this disordered temperature and the nausea, he feels pretty well. At the present moment the case is almost without symptomatology, but later there will be disturbance of the stomach and elevation of temperature, with irregular respiration. There has been some disturbance of the digestive tract; the tongue is coated, but no more than you would expect to find as a consequence of the fever. I think there is no question but that the functions of the pneumogastric nerve are disturbed at its origin; the respiratory disturbance and the nausea cannot be so well accounted for in any other way. You know that in the medulla there is a centre for regulating the heart's action,—a respiratory centre, a vomiting centre, and a heat-regulating centre,—and those are the functions that are largely disturbed in this patient. I bring him before you not because I profess to be able to tell just what the matter is, but because it is a peculiar case, just such as you will be likely to meet with any day. You will find when you get to practising medicine that you rarely or never get cases exactly like those described by your professor of practice; the didactic case is not often seen at the bedside. The teaching of practice deals largely with typical cases, but you may study concussions of the brain from the books a great while and search through much literature and never find a case like this. It is to me a novelty. The most remarkable thing is not that he has these symptoms, but that he has any symptoms; such a blow upon the head as he received is liable to be followed by results very different from those shown here.

I think in the treatment of a case like this the less the doctor does the better. Unless you know just what you are giving medicine for, don't give any at all. You cannot always follow this rule in practice, because sick people will generally demand medicine. The average patient thinks the doctor ought to know the minute he looks at a man what the matter is and what should be done for him. In this case it is not wise to administer any sort of active treatment. Meet important symptoms as they arise, but let your measures be of the mildest possible character. If we would ask ourselves two questions whenever we write a prescription we would do better service to our patients and probably more credit to ourselves,—first, will the prescription do the

patient good? Second, and most important, will it do the patient harm? When you are in grave doubt concerning the pathology, you must be doubtful concerning the treatment. It is far better to trust to the vis medicatrix naturæ than to an uncertain use of drugs.

SCIATICA.

CASE III.—Here is a patient who has a very common malady, and equally hard to manage.

History.—For the last two years he has been unable to work, on account of pain in the right hip and down the posterior surface of the right leg. He was in the hospital quite a while, but no cause for the pain was found, except perhaps sciatica. He had been treated for various affections of the kidneys. Examination of the body revealed nothing wrong except points of tenderness along the course of the sciatic nerve.

Now, these points of tenderness are the diagnostic points in this malady. A great many errors are made in the diagnosis of locomotor ataxia; it sometimes passes for years as sciatica, but the diagnosis of the latter is to be made by a knowledge of the points of tenderness. One of these is over the hip, another in the popliteal space, and a third at the ankle. There are two others often found in sciatica, at the head of the fibula and over the sacrum, but there is no case of sciatica that presents all of these points at once. The doctor has told us of three or four of these points in this case, and the diagnosis must rest upon these. The pains of sciatica are usually local; the patient will tell you he has just such a pain as this man has described as sharp, shooting, and intense, but the locomotor ataxia patient will localize his pain in some particular spot, the size of a half or quarter of a dollar. In muscular rheumatism, which is often mistaken for sciatica, the pain is rather a muscular soreness; it does not follow the course of the nerve-trunks, and there are none of the puncta dolorosa. Most cases of sciatica are something more than mere functional disturbance of nutrition of the nerve which constitutes neuralgia; affections of the sciatic nerve are usually inflammatory, and I think we may safely say that the great majority of cases of sciatica are really cases of neuritis. They usually show disturbance of nutrition; the limb that is the seat of the sciatica atrophies not very markedly, but there is some wasting of the muscle and considerable loss of muscular power. When other nerves are the seat of neuralgic disturbance we observe but little change in the associated muscles. This man's history is a fair specimen of most cases of sciatica, and it seems to me if these cases

were treated on the neuritis basis we would have better results. I advise you in a case of acute sciatica to put your patient to bed with his limb in a splint and keep it absolutely still, giving him only such an amount of anodynes as will allay the intensity of his pain, and applying either heat or cold. Intense heat and intense cold have very much the same effect upon the inflammatory processes : sometimes an ice-bag applied along the sciatic nerve will give comfort; sometimes the hot-water bath will give more relief; whichever is most agreeable to the patient should be employed. In addition to this, you should begin early the use of a very mild galvanic current, passing it along the course of the nerve; this should be continued for fifteen minutes at least. Further than this line of treatment, find out, if you can, what is the general disturbance of the patient's nutrition : is he rheumatic, gouty, syphilitic, or anæmic? Try to remedy the general condition. At this man's age (thirty-seven) the majority of cases of sciatica are either rheumatic or syphilitic; later in life gout becomes an important factor, and later still degeneration of blood-vessels. In women disturbance of the pelvic viscera, displacements of the uterus, etc., and in men tumors in the pelvis, and in either sex obstinate constipation, may also cause sciatica. If you ask a patient if he has had rheumatism, he will usually say, as this man does, that he has; closer inquiry, however, will reveal that he simply had pain and no swelling, but there cannot be rheumatism without swelling. This man has had what is called the bloodless stretching of the sciatic nerve, which has seemed to benefit him; he probably had an old neuritis, and by this operation some of the adhesions in the sciatic nerve were broken up, which has contributed to his comfort. This stretching of the sciatic nerve must be done with care; it is dangerous; but if done with caution it is sometimes of benefit. I believe it is one of the best procedures we should keep for cases that have resisted ordinary treatment and passed into this chronic condition. In addition to the stretching of the sciatic nerve, this man would probably be benefited by the use of the galvanic current and by a combination of alteratives and tonics. I would give him potassium iodide in liberal doses, combined or associated with tonics. He should take before meals from five to fifteen grains of the iodide, the amount depending upon his toleration, and after meals a combination of strychnine, iron, and quinine. This is the way to manage most of these disturbances of the nervous system. Where the potassium iodide is not well tolerated you will get excellent results from bichloride of mercury. It is a common practice with me in these cases to give bichloride of mercury in doses of one-thirtieth

or one-fortieth of a grain three times a day before meals; the combination of iron, strychnine, and quinine to be taken after meals. This line of treatment should be kept up week after week, and will often yield most gratifying results. Do not neglect the matter of elimination by the bowels and kidneys in any case.

<div style="text-align:center">TWO CASES OF CHOREA.</div>

CASE IV.—*History.*—This girl began to menstruate about a year and a half ago, was quite regular for a few times, then menstruation ceased altogether. The period recurred once last July, accompanied by a good deal of pain. Last spring she went to work in a bag-factory, and soon after began to develop nervous symptoms. She eats well, but does not sleep well, and her bowels are constipated.

You notice that there are irregular muscular movements, first one leg and then the other being thrown about, and the same being true of the arms and hands. Every now and then, also, there are jerkings and twitchings of the facial muscles, and the head is thrown back and forth, or to one side or the other.

It is a case of chorea, the popular name of which is St. Vitus's dance, from the fact that during certain epidemics of nervous disturbances that occurred in the Middle Ages as a consequence of religious excitement the patients were taken to the church of St. Vitus, where many of them were cured. Most of the movements are purposeless and without reason; the condition has therefore been aptly termed insanity of the muscles. Chorea is a very ancient disease: we have evidence of its having been observed in very early times. Its clinical phenomena are perfectly familiar to us. It is, as a rule, most easy to diagnose, because there is no other disorder that presents these irregular, purposeless muscular movements; but as to its pathogenesis we are to-day pretty much where we were in the infancy of medical science.

She tells us that she had dizziness before the irregular muscular movements began. As a rule these patients, before the first attack of chorea, complain of headache and dizziness, and show marked change of disposition, becoming fretful, irritable, and uncontrollable; they lose their love of study, if attending school; they lose the power of concentrating the attention, and as a consequence experience loss of memory. As a rule, the muscular movements that we see here upon both sides of the body begin on one side. In this case she tells us they first appeared on the left. Primarily there is a series of mental symptoms with headache and dizziness; then unilateral muscular disturbance, which later becomes bilateral. I think a careful study of

the sequence of the clinical phenomena in this case will aid us at least in locating the seat of the lesion. Chorea occasionally proves fatal, but that is not common, and in such instances post-mortem examination reveals degeneration of the motor tracts of the spinal cord, and pathological conditions in the basal ganglia, usually due to embolisms of those blood-vessels that supply optic thalamus and the corpus striata on one side or the other. But cases such as this and the majority of cases cannot possibly have as their issue either a degeneration of the spinal cord or a marked lesion of the basal ganglia, because the rule in chorea is perfect recovery; it is the exception not to obtain perfect return of health within six weeks. Hence, whatever the pathological basis is in most instances, it cannot be any serious organic disturbance. It is my impression that the disease may be properly referred to the motor and intellectual territories of the brain, the cortex, and that it is due to partial exhaustion rather than to any palpable organic disease. It is most likely to occur in children about the developmental period,—the age of puberty,—and is vastly more frequent among civilized people than among the lower races. For example, before the rebellion chorea was unknown among the negro children of the South, although it was common enough in the families of their masters; since these negroes have been freed from slavery and begun the process of intellectual development, chorea is common among them. It has some connection with the intellectual growth of the child, and is a disease of the spring-time, occurring in March and April much more frequently than at any other time of the year; and a case occurring in certain months is very likely to recur at the same time the year after. This is important to bear in mind, that special measures may be taken against a relapse at the expected time. I believe that undue educational effort has much to do with the occurrence of chorea; it commonly occurs at a time when radical developmental changes are taking place, and when the child is engaged at school. But it is not limited to this period, and every now and then may arise in the early months of pregnancy, the mental excitement of the woman and the worry and apprehension that often accompany this condition being in large measure responsible for its appearance. These cases are usually the most serious examples of the malady.

What shall be done for the patient? The special defect in her nutrition must be searched for; there is sometimes a connection between this disease and scarlet fever; there is also a relation, which has never been very clearly explained, between chorea and rheumatism, though the anæmia of the rheumatic diathesis has doubtless much to

do with the other malady. Again, it is important to know the true condition of the heart: if there is an organic murmur, which not infrequently happens in these cases, the prognosis will not be encouraging, because of the chances of embolism due to detachment of fragments from the diseased endocardium, and because a crippled heart has but poor opportunities for compensation in such a condition as chorea. A simple anæmic murmur does not necessarily influence the prognosis. There is no murmur in this case. You notice how this patient puts out her tongue: she protrudes it partially with a quick movement, hesitates a moment, then forcibly thrusts it out. That is the choreic thrust of the tongue.

There are few drugs that are of service in this disease. Of course any particular diathesis like the rheumatic must be appropriately combated, but there are few remedies that really influence the disease, and of those few I would put at the head of the list, as being the most universally useful, arsenious acid. But unless it is given freely it is as inefficient as so much water. It must be pushed almost to its therapeutical limits. Control of the muscular movements does not begin until its administration has been carried to a point just short of the toxic effects. When the bowels become slightly disturbed, and there is occasional pain in the stomach and a little puffiness of the under eyelids, the curative influence of the drug will begin to be manifest. As a matter of course, while taking such doses the patient must be under the physician's close observation. You should always begin with a small dose in a child of this age, say three drops of liquor potassæ arsenitis after each meal, increasing the daily amount taken by one drop. Continued and increased in this way, frequently a patient of this age will take with benefit twelve or fifteen drops, and even more, three times a day. I have yet to see any bad effects from the cautious use of arsenious acid, and I have by this method time and again succeeded in arresting these irregular movements when others had failed completely in the use of the drug. I think there should also be a moderate employment of alcoholic stimulants. One of the physiological effects of alcohol is the production of anæsthesia; it is a quieting and soothing remedy in chorea by virtue of this property. Of all forms of alcohol, port wine seems most serviceable here, because it not only possesses the anæsthetic property, but has some considerable nutritive value besides. I am in the habit of giving this to my choreic patients in pretty full doses. Arsenious acid and port wine, I think, are the two principal medicinal agents with which to combat this affection. Some of these cases do not sleep well, and consequently

require the aid of some hypnotic; I believe the careful and judicious use of chloral will give the best results in this direction. I would give such a patient as this from two to five grains, or even more,—sufficient, indeed, to secure a good sleep. Some cases are benefited by the liberal administration of iron, quinine, and strychnine, and all require the most nutritious, easily digestible, and assimilable food. Sometimes we get benefit from the local application of the ether spray up and down the spine when ordinary measures fail to diminish the paroxysms. I think, also, there should be a judicious use of calisthenics, and would advise regular exercise accompanied by music, in as rhythmical a way as possible. Static electricity used by insulation and ether spraying of the spine and head are useful. I think the hospital is a good place for this patient. She will probably do better here than at her home; the quiet and order that prevail will be of service to her.

CASE V.—*History.*—Blanche W., fourteen years old. At the age of four and one-half she had a severe attack of scarlet fever; the skin on the soles of the feet and palms of the hands coming off in one piece. Had some trouble with vision, and did not seem to be able to control the muscles. She was treated with electricity and recovered. Six weeks ago her mother noticed a return of the nervous symptoms; she dropped things, and had fits of laughing and crying. She has not menstruated yet. She has occasional headaches and tenderness on the right side below the waist-line, but eats and sleeps well. She is suspected of the habit of masturbation.

From the history of an attack of chorea two years ago, these late symptoms would seem to be the beginning of a relapse. She has the symptoms I described a moment ago as characteristic of the initial stage,—headache, dizziness, unilateral disturbance of muscular power, and a certain hebetude of mind which I did not mention. You observe how long it takes her to get an idea expressed in words. There is usually in these cases more or less mental disturbance, and this may have been the cause of her fits of crying. As a rule these patients are peevish and irritable, hard to please and difficult to control. As a rule there is also more or less disturbance of memory, especially in children going to school. They put the usual number of hours' study upon their lessons, but when they come to recite are unable to remember. The doctor tells us that was one of the symptoms noticed in this case.

This illustrates to you the beginning of chorea: the symptoms are altogether cortical in origin, confined to that part of the brain that has to do with the higher cerebral functions. There is a little irregular movement of the muscles in this case now; after a while, unless we

succeed in arresting the disease, she will have the same irregular, purposeless muscular movements that characterized the other case. If you watch her right arm carefully, you will notice every now and then an irregular spasmodic movement that is especially marked if you take her hand and grasp it for a few moments. These muscular movements—just beginning to be manifest in this case—are much more marked in the right hand than in the left. The tongue is fairly clean, and no heart-trouble is reported. We will make the treatment the same in this case as in the other, giving her arsenious acid with port wine, securing for her plenty of sleep and an abundance of nutritious and easily digestible food. Attention must also be given to the condition of the bowels. It may be that the disease can be arrested before it develops into the manifest irregularity shown in the other case.

Surgery.

CASES OF CARCINOMA OF THE RECTUM.

CLINICAL LECTURE DELIVERED AT UNIVERSITY COLLEGE HOSPITAL.

BY CHRISTOPHER HEATH, F.R.C.S.,

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GENTLEMEN,—I have had under my care lately in the hospital three cases of rectal disease, upon which I wish to found some observations to-day. One of them is still in the hospital, and you have had an opportunity of seeing him just now. He is the man upon whom I performed the operation of colotomy three weeks ago. That is a case of ordinary cancer of the rectum, if one may so call it ; and let me say that cancer of the rectum may be conveniently divided into—(a) the laminar form, when there is a cancerous surface developed at some point in the rectum ; (b) the nodular form, where there is a large mass projecting more or less into the rectum ; and (c)—the most serious form of all—the annular, where we have a distinct ring of disease surrounding the bowel. Now, these three forms, of course, are readily made out by digital examination, and I may say that of the three the annular is by far the most serious, because the tendency of the ring to contract is very great, and no one can tell how soon the contraction may become of a dangerous character, or how soon, by the accidental impaction of a mass of hard fæces in that diminished ring, you may have the patient brought into a condition of great and immediate danger.

The case I want to speak about first is a man fifty-two years of age, who was admitted here on the 17th of September. About three months before his admission he had an attack of diarrhœa, and then noticed streaks of blood in his motions. He had a good deal of pain after passing a motion, the pain running " up his body,"—that means, of course, up the bowel. The patient had also noticed a little slime in his fæces. The bowels had been loose for the last three months, and the motions generally contained streaks of blood. On September 6, eleven days before admission, he passed a large quantity of blood,— about a quarter of a pint, as he thinks,—bright red in color. The

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patient says that before passing a motion he passes a good deal of wind, and the passage feels sore after the motion, as if there were something sticking there. He has lost flesh a little; his appetite has not been so good as usual. I may just say that there is this curious point in his family history, that he had eleven brothers and sisters, and that one brother had a growth in his back passage, for which colotomy was performed; so that it is pretty clear that there was a case of carcinoma of the rectum in another member of the family besides the one who comes under our notice.

When I came to examine this man, who was otherwise fairly healthy looking, I found that he had an ulcer, with well-marked everted edges, on the anterior wall of the bowel. It was rounded in shape and about two inches in diameter, and its lower border reached to within two-thirds of an inch of the margin of the anus; the edges were rather sharp and the depth was considerable. That is probably partly due to the raising of the edges. The ulcer bleeds very easily on examination, and is very tender. The finger reaches well beyond its limit, where there is healthy bowel. The patient has slight frequency of micturition, which has been more marked during the last three months. Here was a man, otherwise in fairly good health, who was suffering constant pain, and pain, too, of an agonizing character, in the rectum, which had already led, as you see, to frequency of micturition. When I examined him I found at once that he had an ulcerated patch on the bladder side of the rectum, which I had no hesitation in saying at once was epithelioma, and the question came, What is best to be done for him?

It was hardly a case in which one could advise colotomy, and, moreover, colotomy would probably not have given that relief which we sought; and, after thinking it over, it seemed to me to be one of those exceptional cases where one might venture to deal locally with the disease. And, accordingly, if you remember, on September 19 I had the patient put thoroughly under chloroform, and then I carefully dilated the sphincter ani with my fingers, keeping them in for a few minutes to get the aperture well dilated, and then I proceeded to scrape with a sharp spoon the edges of the ulcer and very slightly the surface,—because you must remember that we were very close upon the bladder, and a little roughness might have opened into the bladder directly, which was the very thing I wished to avoid. However, I am happy to say that no occurrence of that kind took place, and I satisfied myself that I had scraped away a very considerable amount of epitheliomatous deposit in the margins, and had slightly

scarified and scraped the whole surface of the ulcer. We had the rectum washed out regularly, and we gave him some morphine to relieve the pain, and he has made a perfectly good recovery so far,—I mean that he has received relief from his sufferings. Within a day or two of the operation he told me that he felt very much easier, and that he had lost the greater part of his pain. We kept him in here until the 23d of October, when he was discharged with the ulcer not healed, but very much contracted in size, and he has gone away in a fairly comfortable condition, which I hope may last some time. I do not, for a moment, profess to have cured him, but what I hope is this,— that, having thoroughly scraped away the disease, it may be some time before a fresh deposit takes place there, and that in the mean time he will be in considerable comfort. The great fear in his case, of course, is, that perforation will take place, sooner or later, between the rectum and the bladder; and the proof of that will be, that he will find his urine trickling down into the rectum. The rectum is very intolerant of urine, and he will therefore be compelled immediately to void the contents of the rectum, which will be mainly urine; and when a patient gets into that stage his life is exceedingly miserable. The difficulty, of course, is, that he has to be constantly either sitting on a night-stool or using a bed-pan, because he cannot retain the urine which gets into his rectum more than for a few minutes, and he has to void it immediately, and of course both day and night. Would colotomy relieve that? Unfortunately, it does not. Colotomy will prevent the fæces getting into the bladder, and if that event should occur it is worth while doing the operation; but I hardly think it is likely to occur in this case. The probability is, that while the urine will find its way out, the fæces will not find their way in until the hole becomes a very large one.

Next I will mention a woman whose case was also a little unusual. You will remember, in the first place, that she had recently undergone a most successful operation for ovariotomy. She had been admitted under Dr. Spencer's care, and he had removed an ovarian tumor, and she had made a perfectly good recovery, and it is a little curious that whilst she was in the hospital no suspicion seems to have been aroused of any disease in her rectum. She was a woman of forty years of age, and had had a family, and about twelve months ago, in September, 1893, she noticed a bearing down upon the back passage. She saw her doctor, who said that she was four months pregnant. That proved to be a mistake: it was merely the early stage of the ovarian tumor which misled him, and when this was recognized she was sent into the hospital to have it removed. When she came out, after ovariotomy, she

still had the same feeling in the back passage, and especially after she stood up the pain became worse. Then she went again to her doctor, who examined her and sent her in here. Her condition then was as follows : at the back part of the rectum, in the hollow of the sacrum, there was a mass,—not very large, but a mass of epithelioma. The rectum was loose—was not in any way attached to the bone—and there was not much infiltration of the tissues around it, and it seemed to be just one of those exceptional cases where I might venture to remove the local growth. I have had experience of doing that on two occasions. In the year 1889 I had under my care, first a lady and afterwards a gentleman, both of them having limited epithelioma in the rectum, and I performed upon them both the operation which I did upon this woman,—namely, I thoroughly dilated the sphincter ani, under chloroform, and outlined the growth, through a speculum, with a Paquelin's cautery, and then, with a sharp spoon, I removed as much as I could of it, and, helping with the fingers, eventually got away, in fact, the whole of the disease. I may conclude the reference to those private cases by saying that the lady upon whom I operated in 1889 is still alive. She has had a recurrence, and that I fully expected ; but I wrote to her doctor, and got a reply, dated last Friday, in which he says (the operation was in January, 1889), "Since you saw her with me last year the tumor has grown considerably, extending upward and downward, but, fortunately, not spreading much around the gut. The growth is nodular and indurated. Pus escapes from the bowel involuntarily. There is no trace of any return of the original tumor which you removed from the anterior wall of the rectum." I may say that in that case the tumor was at the front of the rectum ; in this case it was in a much better place,—namely, at the back of the rectum. There was a recurrence, but not quite on the site of the original growth, and the patient is content to go on as she is, and I have had the satisfaction of prolonging her life for some time. With the gentleman who was under my care during that summer I had more difficulty than I had with the female. You will easily understand that in the male it is not so easy to dilate the sphincter nor is it so easy to get inside the rectum as it is in the case of the female, where you have no prostate to deal with, and where the vagina comes between the bladder and the rectum.· However, in this gentleman I succeeded in dilating the sphincter, and I also divided it, and I was enabled in the same way to remove the mass of cancer which existed in his rectum. He, unfortunately, had a recurrence very soon, and he passed out of my care and eventually died, and I believe that nothing more was done for him.

Now, let us get back to the patient in the hospital. In the first place, I had to deal with hemorrhage, and let me remind you that I introduced into her rectum, at the time of the operation, a lithotomy tampon which goes by the name of Mr. Buckston Browne. I did not want to plug the rectum with cotton-wool or sponge, which is always a very effectual way of stopping hemorrhage, because there is this inconvenience, that you prevent any flatus passing out of the bowel, and it puts the patient into great pain not to be able to get rid of the flatus which is distending the colon. Therefore I employed this tampon, which you do not often see used, because nowadays we seldom do perineal lithotomy. If I were going to use it again for such a case as this woman's, I should take off the linen cap before I put it in, for this reason : we found very great difficulty in removing this tampon some days after the operation when I wanted to get rid of it, and the reason was, that the linen had become adherent to the raw surface, and it really was exceedingly difficult to get it away. That difficulty could be overcome by leaving off the linen cover and using the india-rubber, which would come in close contact with the sore part, and would not be so likely to adhere to it. However, it answered its purpose perfectly satisfactorily ; the patient had no hemorrhage after the operation, and three days afterwards we removed the tampon and had the rectum washed out. These two cases, male and female, were in here at the same time ; and let me remind you of one incident in the man's case, which was, that having had his rectum washed out with carbolic lotion, he suddenly became seriously ill. There seemed to be no doubt that he had rapidly absorbed the carbolic, and his urine became dark colored ; but this illness passed off, the temperature went down again and became normal in the course of a few hours, and the effect of the carbolic passed off. Warned by that, I stopped the carbolic injection for the woman at once, and in her case we used creolin, which seems quite as effective as the carbolic lotion, without any immediate risk. In the man's case we used Condy's fluid, so as to avoid any possibility of the same occurrence happening. Both these patients made very good recoveries. The man was in the hospital just five weeks, and the woman was in from September 24 to October 30 ; so that they were in for about the same time,—five weeks. They went out very much relieved, and in both cases, I am happy to say, the wound had very much contracted ; in neither case was it completely healed, but certainly it was much contracted, and the patients were in a satisfactory condition.

I am quite certain that those are exceptional cases in which one can advise this kind of operation, and that it is only to be done in cases

where the epithelioma is quite limited, and where you feel pretty con-
fident that you can get the whole of the disease away. As you know,
unfortunately, the cases of rectal cancer that come here are generally
much more advanced than that, and then comes the question whether
one shall venture to interfere locally at all, and you may have heard me
express the opinion which I hold, that the operation of resection of
the rectum is not a desirable one. I have done it, and I have given up
doing it because I don't think it answers its purpose. The operation
is this. In the first place you put a bistoury in, and do what is some-
times called proctotomy,—i.e., divide the rectum in its posterior aspect
completely down to the bone; and then you dissect away the diseased
tissue so far as you can reach, and no one would venture, I think, to go
beyond the reach of the finger. If you can touch the outside limit of
the growth about two and a half inches above the anus, you may ven-
ture to remove it; but if you cannot reach the upper limit of the
growth completely with your finger, you had very much better let the
case alone, because experience in these cases has shown that if you go
beyond three inches the probability is that you will open the fold of
the peritoneum, which is reflected, as you will remember, from the
rectum on the bladder,—the recto-vesical pouch; and if you open that
you add very materially to the risk of the operation, because it is almost
impossible to prevent the peritoneum becoming fouled with fæcal matter.
The operation of removing the rectum came into vogue some years ago,
and it was, if I may use the expression, boomed a good deal at the
time. One or two surgeons thought they got great successes with this
proceeding; but it is curious to find how seldom it is done now. I
had the opportunity of watching some years ago a case of the kind
operated upon by another surgeon, who had, no doubt, done the opera-
tion effectually and thoroughly; but, unfortunately, the patient got such
a contraction of the lower end of the wound, where the rectum had been
removed, that eventually the same surgeon had to perform colotomy.
Now, if, as I believe often happens, the contraction is so great as to
lead eventually to colotomy, the question is, whether it would not be
better to do colotomy at first, and perhaps do nothing more, or, at all
events, to do colotomy before attempting to remove the lower end of
the rectum, so as to obviate any difficulty that may arise from contrac-
tion afterwards.

Then there is another operation which I think it right to mention
to you, and that is an even more extensive removal of the rectum than
the one I have spoken of, and it is generally known by the name of
Kraske's operation. It has been done more than once in this hospital

by Mr. Godlee, who, I believe, thinks well of it. But I have got here a book,—one of the most recent English books on diseases of the rectum (Cooper and Edwards),—and I find this statement: "At the International Medical Congress, held in Berlin in 1890, Dr. Axel Iversen, of Copenhagen, formulated the following conclusions from two hundred and forty-seven cases of excision of the rectum in Denmark, Sweden, and Norway. 1. The older, as well as the more recent operations (amputation and resection), are only palliative procedures; they are more dangerous than colotomy, but in successful cases result in a longer tenure of life. 2. Extirpation of the entire rectum, together with diseased glands, is the most reasonable method, and in favorable cases the result is a radical cure. The operation is very dangerous when the disease is far advanced. Of nineteen cases of Kraske's operation, eight died. 3. The greater number of cases must still, as formerly, be treated palliatively,—i.e., by colotomy; most patients present themselves too late for a radical operation."

Now, you must understand what Kraske's operation is. It is a resection of the coccyx and the lower portion of the sacrum; the back of the bone being exposed, the fourth piece of the sacrum is chiselled through and removed, principally on the left side, so as to enable the operator to get down to the rectum. Having done that, he can remove the diseased portion and bring out the healthy end of the rectum and attach it to the sacrum, so that if all goes well the patient has an anus a good deal higher up, of course, in the back than he would have had in the natural course of events. As I say, it is not an operation that I have done, and I do not think it has been much performed in England, and, so far as I can judge, it is hardly a desirable proceeding.

Let me now come back to the colotomy case, and let me remind you that colotomy again has undergone a good deal of extension of late, because ten years ago lumbar colotomy was the only operation a surgeon ever thought of performing, whereas nowadays, since Mr. Reeves introduced the operation some ten years back, most surgeons, I think, have given in to the idea that inguinal colotomy is easier and better in every way than lumbar colotomy. I would not say that I would perform inguinal colotomy in every case: I still do lumbar colotomy in cases where I am aware that there has been obstruction going on for some days, and where I am quite certain from the condition of the patient that the bowels must be enormously distended with liquid fæces. In these cases, if you do inguinal colotomy (which, you will remember, consists in opening the peritoneum and then getting hold of the bowel there), you will run a great and unjustifiable risk of soiling the perito-

neum, and so bringing on fatal peritonitis. In these cases, therefore, I still advise you to do lumbar colotomy,—in the left loin, that is. It is an operation somewhat more difficult than the inguinal variety; but still, with care, it can be done, and there you will have the advantage of emptying the colon outside the peritoneum, and run none of that risk of which I have just spoken. Now, the operation which you saw me do in this man who is still in the ward was the ordinary inguinal colotomy. Let me just say about it that we have improved it in this way, that we make our incision very much smaller than we used to do. It used to be some three or four inches long; now it is only two inches long, and it should be close to the anterior superior spinous process of the ilium, half above and half below it. And then you will have noticed—acting on, I believe, an original suggestion of Mr. Barker's—that I did this: I tore through the muscles instead of cutting them. When I have got through the skin and the external oblique, I lay my knife down and with my fingers feel my way through the fibres of the internal oblique and transversalis, pull the wound open with some little force, separating the muscular fibres, and so reach down at once to the peritoneum. There is no difficulty in doing that; there is less hemorrhage, and there is this great advantage afterwards, that the muscles seem to form a sort of sphincter round the opening, and tend, therefore, to prevent any involuntary passage of fæces; and you will find that this man in the ward will tell us, as most of these patients do, that they have a surprising amount of power over the artificial anus; that they can restrain the passage of fæcal matter until they have got a vessel ready to receive it, and that, in fact, they get into as regular habits of defecation from the new anus as they did with the natural passage.

There is another point that I wish to mention, and that is what you see me invariably do,—namely, pass a glass rod through the mesocolon in order to get a thorough spur between the upper and lower parts of the colon. Now, I do not think that any stitch will give you as effectual a spur as a glass rod, which you see me habitually use, passed through the mesocolon and left to rest on each side of the wound. This is a rod about four inches long, and it is left *in situ* for three or four days,—until, in fact, I do the second part of the operation and open the bowel,—and then I am very careful to take the glass rod out before I disturb the dressings much, because I have found by experience that unless you do that you are rather apt to pull upon the glass rod and tear away the tender adhesions which have formed between the skin and the bowel. Some surgeons, I believe, are content to trust to the

glass rod only, and do not use any stitches. That, I think, is a little rash, and you will notice that I always put some stitches in. But we have completely given up taking the trouble to fish up the parietal peritoneum, as we used to do a year or two ago, and attach it to the skin. We simply now pick up the skin, attach the bowel to it by some half dozen stitches, and let the peritoneum slide back and take care of itself, and no doubt it does become adherent to the bowel farther back. These patients are usually operated upon on a Wednesday, and I leave the bowel unopened until Monday. It does happen, however, that now and then one has to open it on Saturday or Sunday, but as a rule I find these patients go very comfortably for the four days, and on the fifth day I open the bowel. Now, those who were present when I opened it the other day will remember that the bowel is perfectly insensitive. We gave no chloroform, and the patient made no complaint; in fact, I do not think he knew until he was told that I had cut away a piece of the bowel. But let me say that I cut away the projecting portion, and that it is not enough to merely make a slit in it. If you do that you will find that you have a quantity of superabundant tissue which will give you trouble. You should cut into the bowel with scissors, so as to make sure that you are in the cavity, and then trim off a piece on each side, taking care not to go too near the stitches for fear of dividing them, because that might lead to trouble; but cutting away all superfluous tissue, so that there may be left exposed the two openings of the bowel, with a spur between them. Now, in the case of this patient, and in the majority of cases, the upper opening is the opening through which the fæces pass, and the lower opening is the one which leads down into the rectum, which is now disused. But let me remind you that every now and then—and nobody can tell when it may happen—the bowel gets a curious twist (it never happened to me but once, and that in a private case), and you will find that the motion comes through the lower opening instead of from the upper one. So far as I have seen, it makes no difference whatever to the patient; but if you have told the patient that the motion is coming from the upper opening, you have to eat your words, and explain that in the peculiar circumstances of his case the motions will come from below, but that it makes no difference whatever.

As I have already said, the operation is most frequently done on the left side, and for obvious reasons; but it may happen to you, as it has happened to me, to have to do the operation on the right side, and then there is this difference, that if you are operating on the right side, coming, of course, upon the cæcum, you will find that you will not

be able to get the glass rod in, because the bowel is so bound down to the iliac fossa that it is impossible to do so without undue tearing. But I have not found it to make much difference, and you can stitch the cæcum very comfortably to the skin, just as you would the left colon, and the result will be just as satisfactory when you come to open the bowel.

Having got your patient through the first difficulties, of course you have to consider his after-treatment, and you have seen me to-day apply a simple pad of india-rubber, with a projecting finger which goes into the lower opening of the bowel, leaving the upper opening patent, so that any discharge which happens to get out may accumulate under the ridge, and thus prevent any soiling of the dressings. That pad answers very well for the first few weeks; but when patients get about, particularly private patients, they like something more in the way of a truss, and here is a very convenient form of instrument,—nothing more than the ordinary spring-truss with a hollow india-rubber cap, as you see, fitted on to it. The spring goes round the pelvis, the cup fits on to the opening, and patients can go about very comfortably, and they do not find their linen soiled at all, and if there is any discharge it collects in the cup until they have an opportunity of emptying it. Here is another more elaborate truss, with a cap which leads down into a tube, and there is a screw-stopper here which can be taken out to have it emptied and then washed out. But it has this great objection : the aperture is large, and we found that in use the mucous membrane of the bowel tended to prolapse into the cap, and then it became very painful.

Lastly, let me remind you of the necessity for washing out the disused portion of the rectum periodically, in order to prevent the accumulation of mucus and discharge.

THE PRINCIPLES WHICH GOVERN OPERATIONS FOR INFLAMMATORY PROCESSES IN BONE.

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GENTLEMEN,—We shall consider at this lecture the principles which govern operations for inflammatory processes in bone. This is a subject of great importance, and one of special interest to the general practitioner, who must often take charge of cases of necrosis.

Extensive necrosis has its origin in acute osteomyelitis, in reality a phlegmon of the bone, a sloughing of the bone, analogous to suppuration in the soft parts, but more rapid and certain in its results because the bone permits no expansion, and the exudation sooner occludes the vessels which furnish nutriment to the part. Grave mistakes in diagnosis are frequent in this condition, the symptoms being mistaken for those of other maladies, especially acute rheumatism and typhoid fever. Acute osteomyelitis has, however, its places of predilection. It oftenest attacks the upper end of the tibia and the lower end of the femur. The symptoms of acute osteomyelitis are a chill following a traumatism of greater or less severity, or exposure to the weather. We may have rigors, with a temperature of 104° or 105° F. The tongue is coated, the breath foul, there is nausea, thirst, the eyes are bloodshot. The physical signs show the foot drawn up, the knee bent and painful. There is swelling; but the swelling is white, not red. There is deep-seated œdema. The case may be mistaken for one of acute articular rheumatism. The patient is put upon the salicylates for three or four weeks, and the swelling gets larger and larger. Finally a needle is inserted, and the presence of pus is demonstrated. We then hear that the rheumatism has led to an abscess, but when this abscess is evacuated the joint is found free. After the abscess a sinus remains which will not heal, and a probe shows at the bottom of this sinus a sequestrum,

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and then the eyes of the physician are opened. It was no case of acute articular rheumatism, but something else. Such mistakes are very frequent, and they are errors which it is very embarrassing to make. The patient does not get well, and your rival is called in at a time when the diagnosis is easy. His wisdom is really no greater than yours ; but he is called at a time when the merest tyro could make a diagnosis. There is a fistula, there is a sequestrum, the treatment for weeks or months has been misdirected ; the trouble is clearly due to the presence of dead bone.

Acute osteomyelitis may be mistaken, then, first, for acute articular rheumatism. It may be mistaken, in the second place, for typhoid fever. The patient has some of the most prominent symptoms of typhoid fever. He is unconscious unless violently aroused, and then gives but stupid answers. The temperature is 105° F., and the patient is so dull that he allows you to take hold even of the inflamed area. I recall two such cases which were treated for weeks as cases of typhoid fever. A careful physical examination will, however, reveal the abscess, and with the evacuation of the pus the typhoid symptoms disappear. This patient's typhoid fever has been cured with the knife.

Acute osteomyelitis may be in the child mistaken for spinal meningitis. The general symptoms are similar, and only a careful physical examination will prevent you making a mistake. The diagnosis should be made promptly in these cases, however, not only for the protection of the physician's reputation, but because by prompt treatment we may save the bones from necrosis. In the old books on surgery—Sir Astley Cooper, for instance—this condition is called purulent or suppurating periostitis. The pain is excruciating, indescribably intense, due to the absence of a vent, the pus being confined under the tense periosteum. The first indication, then, is to use the knife and cut through the periosteum to the bone, and not to permit the tension to increase so that it must result in necrosis. In a neglected case the violent symptoms of the onset spontaneously subside after a certain period, the local pain is suddenly alleviated, the temperature falls, and a doughy swelling appears. The periosteum has been penetrated, and the pus has obtained an exit. The improvement lasts for several days, but the external swelling increases, and we have a repetition of the former symptoms, although not accompanied, perhaps, by the same violent pain. Often the patient does not go to a physician at all, but suffers in silence ; or he goes to a physician, and his condition is not recognized until necrosis has occurred, and we have dead bone, with one, two, or three cloacæ leading out from the sequestrum, and the dis-

charge is interminable. In such a case, feeling sure that your line of demarcation has formed and that the necrosed portion is separated from the healthy bone by a mass of granulations, what shall be your action? Formerly the dead bone was extracted, if possible, or if too large for an easy extraction was broken up, and the expulsion of the pieces was left to nature, the surgeon merely pronouncing a benediction over the process which often required years for its completion. Formerly great hemorrhage was unavoidable in operations upon these bones, as the theca is highly vascular. The surgeon feared the laying open of the theca, and contented himself with making a small hatchway into it, and breaking up the sequestrum with forceps. He expected suppuration to follow, and it did follow. Where the surgeon thought that he had removed the fragments, a large flake of bone would separate later, and a second operation would be required. The results were sometimes good, but more often unsatisfactory.

At the present time we find a great ally in the artificial anæmia we are able to establish in the limb. We now shut off the blood-supply, so that we not only avoid loss of blood during the operation, but we have also a dry, clean wound in which to work. We can see what we are doing; it is no longer necessary to sponge as formerly, and when we reach dead bone we are able to recognize it.

Secondly, we no longer dread a large opening into the cavity. It is our routine practice to take off the whole roof of the cavity and to freely expose the sequestrum *in situ*. We then gently lift the sequestrum from its bed as a silver spoon is lifted from its velvet case. We use no violence whatever in this manœuvre, we simply lift it from its bed. Should resistance be met with, and one or another projection of the sequestrum still be held in a recess, the roof of this recess is also taken away, until the sequestrum can be raised without breakage.

Thirdly, the suppuration which formerly followed this operation has now, by our antiseptic methods, been reduced to a minimum. We have also certain advantages in improved methods of operation. We have, first, Neuber's method of closing the cavity. Having removed the roof of the cavity with the chisel and mallet, and having withdrawn the sequestrum and scooped away the unhealthy granulations which line the cavity, we shall have left a healthy bleeding surface, in form resembling the inside surface of a trough, such as you see used in the country for feeding stock. We then dissect up the skin upon either side, and finally fix it in the bottom of the cavity. This is accomplished by means of steel nails and a few taps of the mallet, and primary union is the result. Formerly, six to twelve months were

required for the filling up and cicatrization of a large cavity. Now three or four weeks are sufficient for healing. What a contrast this is to our former methods when we followed the fistula to the dead bone, we took out a piece of the theca with the chisel, we broke the sequestrum into two or more fragments, and then attempted their withdrawal through a small opening. How often it happened that the sequestrum broke, leaving a mass in some distant recess, so that the object of the operation was defeated. The cavity was stuffed with lint, suppuration continued until the cavity closed by granulation, or it did not close, when the operation had to be repeated. As regards the external incision, we no longer slavishly follow the fistulæ. For instance, I never make my incision on the inside of the femur, even though all of the fistulæ may be there. On the outside, between the quadriceps and the muscles of the back of the thigh, I find a region destitute of large vessels, and there I make my long incision, feeling sure that I shall find the sequestrum if it is present, whether I attack it from this or the other side. We no longer make a hatchway through the roof of the cavity, but remove the whole, so that we can follow the irregularities of the sequestrum and remove it intact. We scrape out all the granulations lining the cavity, so that a section of the bone shows a smooth surface.

Where the operation cannot be completed by Neuber's method we have still another resource in the invention of the German surgeon Schede. This depends upon the well-known fact that in an aseptic wound a fresh blood-clot does not act as a foreign body. The granulations encroach upon it, and finally eat it up, as it were, or absorb it. This is the normal process of healing in subcutaneous fractures and many other injuries. A blood-clot forms between the ends of the bones. This organizes, and we have the foundation of callus as a result. By antiseptic precautions we approach the conditions of the subcutaneous fracture. Schede's method utilizes this principle. Where there is not much skin left, or where the skin is cicatricial and unreliable for the amount of tension required for the previous method, with a needle and catgut or silk we sew up the outer wound, leaving only a small opening in the lower angle ununited by sutures. After the removal of the constrictor blood collects in the cavity, the surplus escaping through the opening in the lower angle. For the success of this method we must cover the part with a well-disinfected piece of rubber tissue or Lister's protective. Outside we apply the ordinary dry antiseptic dressing, kept in place with a roller bandage. The object of the rubber or protective is to prevent evaporation and to keep the clot moist. If

the rubber were not used the clot would shrink, and the wound would again open up.   Both of these methods are successful.

In operating for necrosis, you must be careful to leave behind no little spiculæ of bone or granulations, or you may be obliged to reopen and finally pack the cavity.   It is better to prolong the operation ten minutes, twenty minutes, or a half hour, and make a thorough job of it, as you may thereby save the patient months of surgical treatment and suffering.   If you have used no drainage-tube, the first dressing may be removed at the end of several weeks, or when its outer layers become fetid.   This does not mean that the inner dressings or the wound are fetid.   You have often seen a fetid external dressing covering a perfectly clean and sweet dressing beneath.   Many times have I left the dressing intact for four weeks in cases of excision of the knee-joint.

In Neuber's operation, however, we must open the dressing to take out the nails at the end of three, four, or five days.   If agglutination has not occurred by that time it cannot be expected, and the nails are consequently useless.   Where no nails are used the dressing is left undisturbed, certainly for ten days or two weeks.   With exceptions, these rules hold good, not only in operations for acute osteomyelitis or necrosis, but also for any chronic suppurative process or for tuberculosis.

THE TREATMENT OF LATERAL CURVATURE OF THE SPINE.

BY EDWARD H. BRADFORD, M.D.,

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GENTLEMEN,—The deformity of lateral curvature, or rotary lateral curvature, as it is frequently called, is easily recognized; errors in diagnosis are, however, unfortunately not uncommon. This is largely due to the fact that enough attention is not paid to the subject by teachers of surgery. The importance of this affection, however, is considerable, as the deformity is common, and may entail great discomfort, disability, and suffering. In certain localities one adult in a thousand, in other localities as many as one in a hundred, present well-marked scoliosis. If the lighter cases are included, the percentage of lateral curvature among women would be very high. Fortunately in the majority of cases the deformity arrests itself, and causes no trouble except a slight disfigurement. In not a few, however, the deformity increases with the growth of the patient, and contracts the breathing capacity of the lungs, distorts the figure, and reduces the sufferer to a condition of pitiable disability.

Women suffer more frequently than men. But when men are affected the distortion is usually more severe than in women.

It has been said by some writers that this affection is confined to the well-to-do classes. This is, however, an error, as the affection is seen in all classes.

CAUSATION.

Little time will be spent in this lecture on the vexed subject of the causation of lateral curvature, about which much has been written. It may be stated, however, briefly that lateral curvature is caused by lack of strength of the growing bones of the spinal column. The vertebral bodies are not firm, and yield under the superimposed weight; the cause of this is, in all probability, some fault in nutrition or assimilation, or a defect in the firmness of certain of the bones from too rapid

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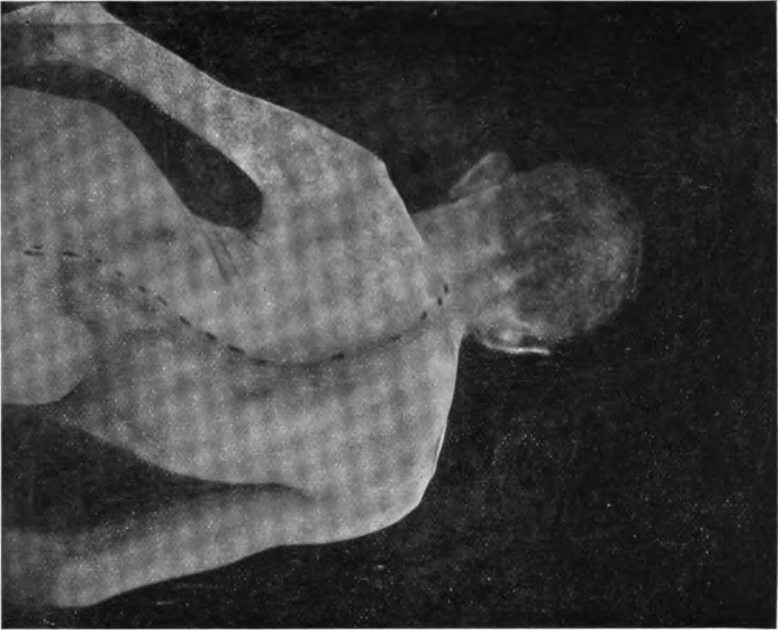
Fig. 1.—A typical case of severe lateral curvature of the spine.
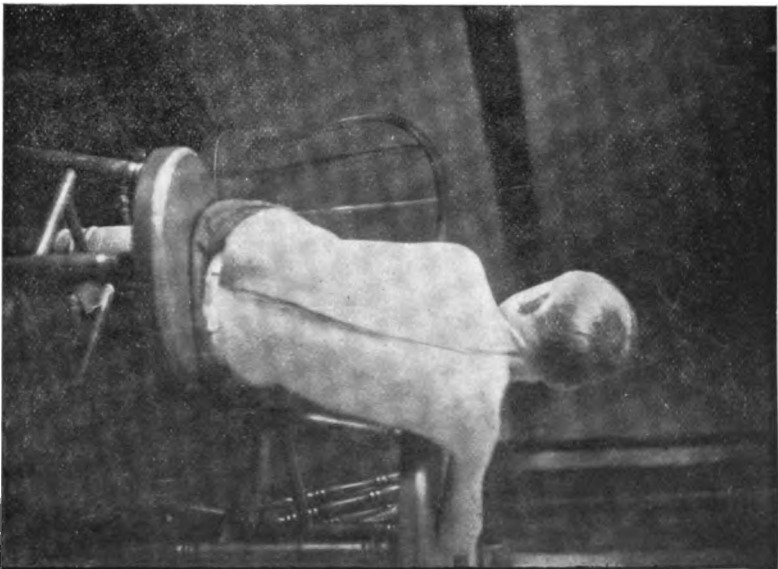
Fig. 2.—Normal back, malposition in writing.

growth. The determining causes are the superimposed weight and some faulty attitude habitually or constantly assumed, so that the bone grows in a twisted condition rather than in a straight condition, in the same way that it is seen that trees in a locality which is exposed to constant winds grow in a shape distorted from the normal type. That this affection is more common in girls than in boys is, in all probability, due to the fact that at a certain age the growth of girls is more rapid than that of boys, and their growth comes younger. It is also true that they are less given to active sports, and for that reason are more prone to faulty positions, and less to healthy assimilation and normal bone development.

The fact that the curve is more common on the right side—that is, with the convexity to the right—is due to the fact that most people are right-handed.

ANATOMICAL CHARACTERISTICS.

Much space is usually devoted in the text-books to a description of the varieties of the curves of the spine. They are classified as long upper, short upper, etc., dorsal, lumbar, single or double, etc. These descriptions are apt to be confusing. The facts, however, are simple. The spine cannot curve one way alone, for the patient could not sit or walk well with the head on a slant. . If the trunk leans to the side the head is held by compensation in the opposite direction in an attempt to keep the balance and to hold the head over to the middle of the base. This makes a double curve. If one leg is shorter than the other there will be a curve in the lumbar region. The pelvis and connected lumbar vertebræ are on a slant; there must be a compensating curve in the trunk to keep the balance; this puts the shoulders in an oblique position, and the head rectifying itself produces another curve in the neck. This makes three curves in the spine. The spinal column varies as to strength and resistance in its different regions, and the curves vary in length and character. Sometimes the curve is more noticeable in one instance than it is in others.

Another simple fact is apt to confuse, and that is the so-called rotation,—that is, the twist. The spine is frequently twisted normally. You will frequently notice that in sitting, and even in standing, the cross axis of the shoulders is on a different plane from the cross axis of the pelvis. More than this, a spine which is made up of a number of interlocked small bones is so constructed that it cannot be bent sideways to any considerable amount without twisting. The bones lacking toughness twist more, and grow abnormally in shape. The connecting

ribs and overlying muscles are also twisted. This gives a curious and characteristic appearance which, though varying in each case, yet varies from a common type.

The difficulties attending the treatment of lateral curvature are great,—not so much in the principles of treatment as in the application of them. This can be illustrated by the examination of any ordinary case which is brought to the consulting-room of the surgeon. The patients are usually young, growing girls, whose mothers recognize the projection of a shoulder or of the hip. The mother is anxious that a good figure be preserved, and consults the nearest physician or surgeon. In the majority of instances the family physician assures the mother that it is of little importance; that a very large number of girls have the same difficulty, and that it will rectify itself in time as the child grows stronger. The physician will prescribe the hypophosphites or cod-liver oil, and the mother is reassured. Such advice as this is manifestly unscientific, irrational, and dangerous. In a large number of cases the deformity does not increase; but where an increase takes place, as is unfortunately sometimes the case, valuable time has been lost in following the advice which has been given. Every physician should, therefore, understand how to examine a case of lateral curvature, should be able to give a prognosis, and to determine whether the case in hand is one which needs active treatment or not.

HOW TO EXAMINE CASES.

The physician should determine, first, whether the spine is a flexible one; second, whether there is any rotation; third, whether the rotation can be corrected by a slight amount of force; and, fourth, whether any muscular weakness is present.

If the back of a healthy child is examined, it will be seen, when the patient stands upon both feet, and with the head erect and arms hanging, that the shoulder-blades are at an equal distance from the meridian line of the trunk. There will be a symmetrical outline of both sides of the thorax, the gluteal fold will be perpendicular, and the lines of the slope at the pelvis will be the same on either side. If the spinous processes are marked with a marking crayon, they will be seen to form a straight line in the middle line of the back. In patients with weak backs, after standing for a short time, it will be noticed that they drop one shoulder, and the line of the spinous processes will curve to one side or the other.

The spine under these circumstances is a flexible one; but the curve can be readily rectified by the muscular effort of the patient. Where a
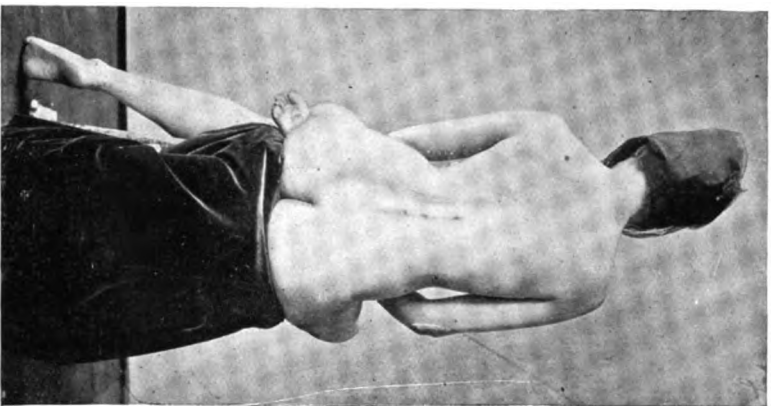
Fig. 3.—Normal back, curved from sitting in a one-sided position.
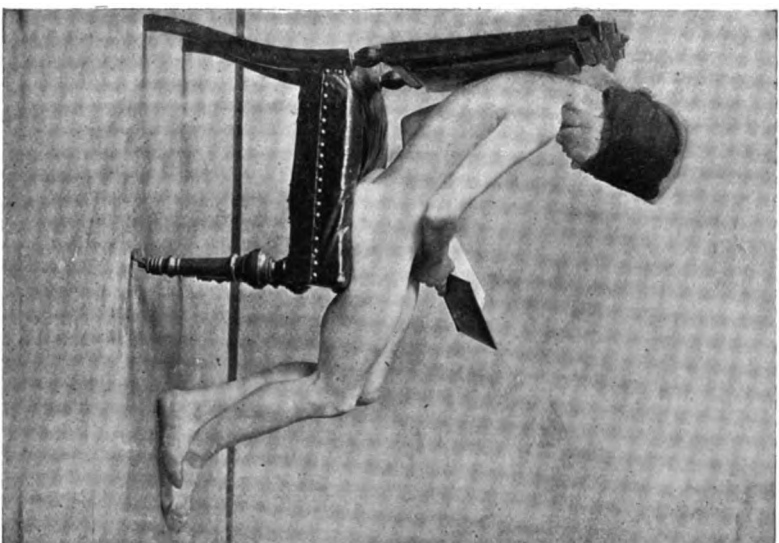
Fig. 4.—Normal back, a lack of support from chair.
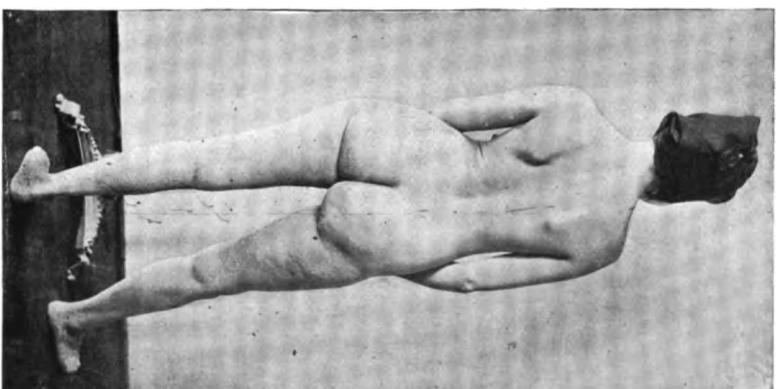
Fig. 5.—Normal back, curve from standing on one foot.

rotary lateral curvature is present it will be seen that one of the shoulder-blades, usually the right, is more prominent than the other. It will also be noticeable, usually, that one of the hips is more prominent than the other. The line of the spinous processes is not straight, but forms a curve, usually with the upper concavity towards the right. Sometimes there are two curves noticeable; one with the convexity towards the right, and the other with the convexity towards the left. When the patient stoops it will be noticed that the side of the convexity is more prominent than the side of the concavity. If the back be looked at along its length, or from above, this curvature and projection does not disappear entirely if the patient is suspended, or if the patient lies down. The amount of disappearance indicates the amount of flexibility of the spine. The projection of the shoulder-blade is due to the amount of rotation or twist of the ribs, and this may be in proportion to the amount of lateral curve, or it may be greater than the curvature. It is this rotation or twist which the surgeon should pay particular attention to, for it is this which causes the distortion, contracts the thorax, and is an indication of the severity of the distortion. If the surgeon is able to correct this rotation or to prevent its increase, he cures the deformity. If he is unable to do so his treatment is a failure.

The amount of fixed rotation can roughly be determined if the surgeon places the patient flat upon her face lying on the floor or on a hard table, the trunk being straight. An ordinary rule is placed directly across the back above the middle of the shoulder-blades, or across the points of the greatest projection, the arms being held at the sides. If rotation be present, the rule will not be parallel with the plane on which the patient lies. The surgeon should also determine the amount of muscular strength. This is readily done by means of a dynamometer fastened to the floor and connected with a strap placed over the patient's neck. The patient attempts to straighten herself, and the amount of pull is registered upon the dynamometer. The surgeon should also inform himself as to the probable rate of growth of the child, judging from the family history of the father and mother. He should also ascertain the child's height and weight, and by means of comparison with tables of height of children learn whether the patient is above or below the normal standard. He should also determine whether the patient has a faulty attitude in standing or sitting. Having made this examination, the surgeon is in a position to tell the mother whether, in his opinion, the curve is likely to increase, or whether it can be neglected, or whether vigorous treatment is necessary.

It may be said that in children who are rapidly growing, or where a great increase of growth is to be expected, an increase of curvature is to be feared. This is especially true if the child is defective in nutrition or assimilation. An increase in the deformity is not to be dreaded in healthy adults if the curve is slight, or in children where the growth is not rapid and their condition is vigorous. A curve with a marked rotation, however, is always to be regarded as a source of anxiety in every growing child.

RECORD.

It is important to avoid self-deception on the part of the surgeon to keep an accurate record of the case. Photographs give, on the whole, the best record of the contours of the trunk, provided they are taken with care. They do not, however, give an idea of the amount of rotation. This can be obtained, however, if the patient stoops forward and a photograph be taken of the bent back ; or if a mirror be placed directly on the patient's head at such an angle as to reflect the contour of the back below, and if the reflection is photographed, the rotation will be recorded.

A number of devices have been recommended for tracing of the contours of the trunk. They are, however, costly, require much attention to work, and are not as accurate as photographs, for the reason that a photograph can be taken instantaneously ; while an accurate contour tracing requires the maintenance of a fixed position for several minutes, during which the patient's position may be altered, and the value of the record diminished.

TREATMENT.

The treatment varies necessarily according to the circumstances of the case, especially according to the amount of flexibility of the spine and the amount of resistance in the spinal column. This is dependent to a large degree upon the age of the patient.

Where there is no osseous deformity the treatment is simple. Where marked osseous deformity is present but little benefit can be obtained from treatment in an adult, though treatment is efficacious in children even in resistant cases.

The measures which are used in treatment can be classified as follows : (1) Steps to promote a correct attitude and carriage ; (2) measures for increasing the flexibility of the spine; and (3) means for correcting the excessive deformity.
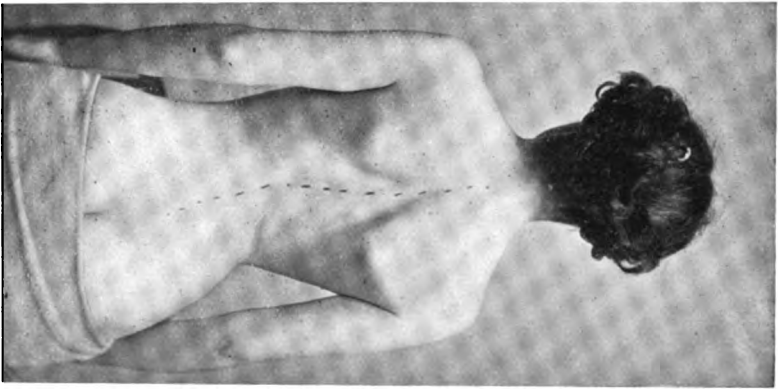
FIG. 6.—Lateral curvature of slight severity.
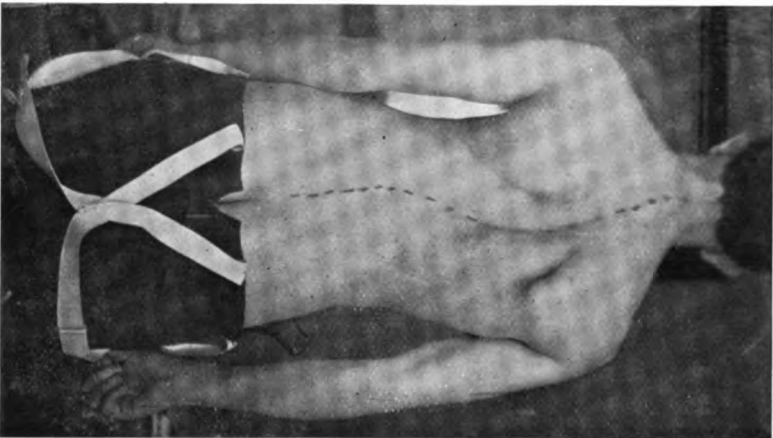
FIG. 7.—Lateral curvature of greater severity.
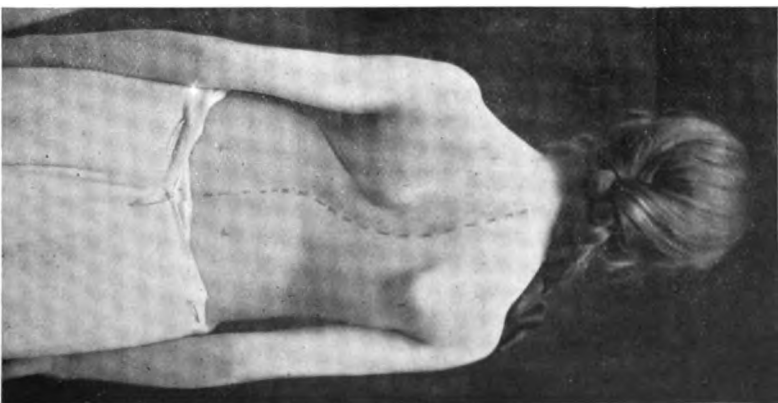
FIG. 8.—Lateral curvature with marked rotation.

MEASURES TO PROMOTE CORRECT CARRIAGE.

These are partly postural and partly gymnastic, and are suitable to the cases with flexible spines. In cases where muscular weakness of the back muscles has been detected, especial exercises should be prescribed. What these exercises should be varies according to the case. The system of so-called Swedish gymnastics, under the direction of a competent nurse, is of value. Exercises with apparatus are also beneficial. They should, however, be done under supervision.

Before prescribing exercises, the child's back should be bared and the position of greatest possible correction should be assumed by the patient, and exercises carried out from this position, the patient returning to this position after each movement.

By the assistance of the surgeon's hands the standing patient should be placed with the trunk in a normal position, and the patient taught

FIG. 9.
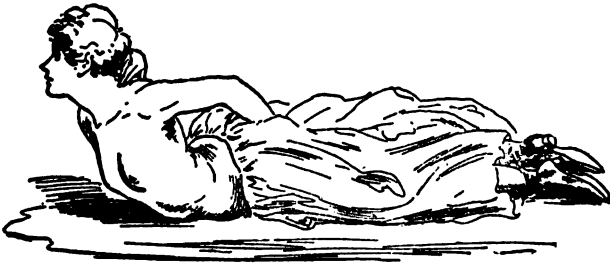
Recumbent backward bending.

to assume this position voluntarily and without assistance, and to walk and sit in this corrected position. Backward bending exercises, both with the patient standing and recumbent, but avoiding the faulty twist of the trunk, are the simplest form of exercise for muscular development in flexible cases of this sort.

It is also important that children of this class should avoid sitting in unsuitable chairs. It will be found that if children having weakened spines form the habit of curling themselves into easy-chairs suited for adults a twist of the spine is unavoidable. Under these circumstances children should be prohibited from remaining in any one position for longer than half an hour at a time, and should be furnished with chairs suitable to the shape of their backs. It is also advisable that patients should be required to lie upon a flat surface from half an hour to an hour daily in the middle of the day. A soft, sagging bed should be prohibited, as well as the use of more than a small pillow.

Massage and electricity may be of advantage to improve the muscular tone. These measures, however, will not be sufficient where there is any rotation; and especially where there is osseous change correction is demanded, the urgency of this depending upon the amount of rotation or amount of osseous change.

FIG. 18.

Recumbent backward bending.

It has hitherto been regarded as impossible to thoroughly correct rotation by any feasible means, but since the teaching of Lorenz, of Vienna, and the amplification of his method, experience has taught that considerable correction could be made in rotation even in children of considerable size and strength.

MEASURES FOR THE INCREASE OF THE FLEXIBILITY OF THE SPINE.

Cases brought to the surgeon are ordinarily not simple. Usually some fixed rotation is present,—that is, the thorax cannot by normal pressure be brought into a normal position, and some rotation is present which does not disappear when the patient is recumbent or suspended. Under these circumstances muscular exercises alone will be insufficient for correction. The contracted tissues need to be stretched.

These cases were considered as not amenable to anything except palliative treatment until Lorenz, of Vienna, demonstrated that forcible correction is of advantage and practicable in growing children. The more elaborate methods of Zander are of great advantage, but they are within the reach only of patients living in a few of the larger cities.
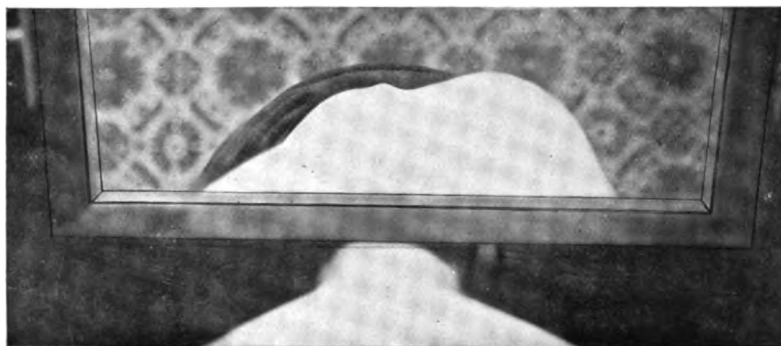
FIG. 10.—Rotation in scoliosis, photographed from a reflection in a slanting mirror at the patient's neck.

FIG. 11.—Lateral curvature.

FIG. 12.—Same case of lateral curvature; position of self-correction.

Several simple means in addition to the ordinary vertical suspension will be found of advantage. The most effective means will be

FIG. 14.
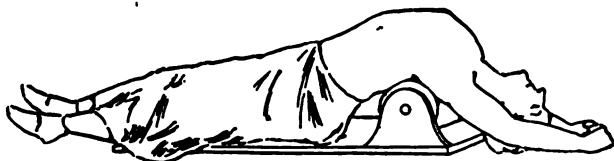
Backward bending exercise.

found in an arrangement suggested by Hoffa, of Winzburg, which has been somewhat modified by a number of surgeons.

FIG. 15.
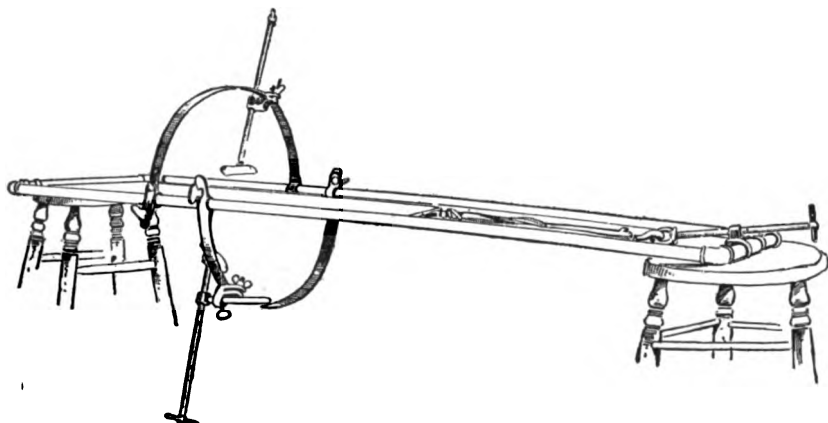
Recumbent correcting appliance for pressure correction, made of iron piping. The patient lies on a stretched sheeting hammock, and correction pressure is applied by screws.

FIG. 16.
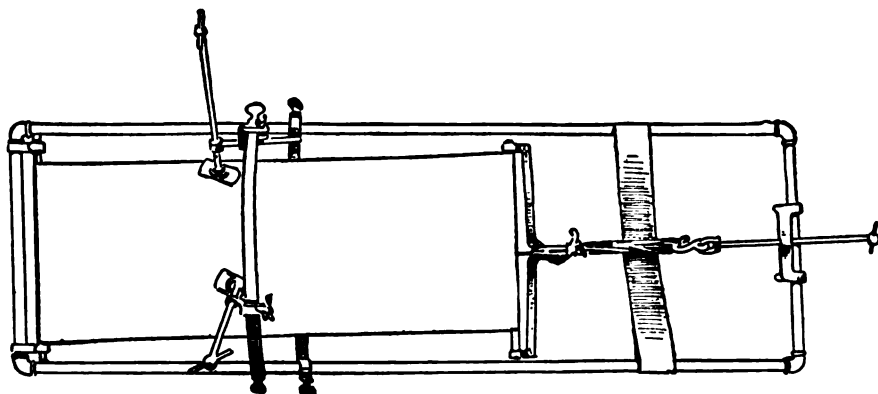
Recumbent correcting appliance; seen from above.

These measures will be found to increase the flexibility in patients up to the age of sixteen and eighteen, or even twenty, if persisted in with thoroughness. After the utmost amount of flexibility has been gained, the surgeon is to determine whether the patient is to be treated simply by correcting exercises, or whether there is need of mechanical appliances. In the majority of cases, where osseous deformity is present, there is need of some form of mechanical appliance. Of these, a large number have been devised ; but those only will be mentioned here which are within the reach of practitioners. In the severest cases rigid appliances are necessary for a time, until the bones become adapted in shape to the correct position. After this lighter appliances can be used. In the severest form of distortion, or one which causes the greatest amount of anxiety, the most radical means are necessary, and these will be found to be the application of the plaster jacket with the patient in the corrected position. This cannot be done by simple suspension, but by suspension with forcible correction added. A jacket is applied and worn by the patient as in caries of the spine without removing it, the jacket being changed once fortnightly, or every month. The amount of correction which can be gained at first is small. Afterwards a greater amount is obtained, and more of correction than would at first seem possible can in this way be effected without discomfort to the patient. A removable jacket can be furnished later, made either of plaster or leather or paper. In the severest cases treatment of this sort is needed for six months or a year, after which time it may be laid aside, and a simple appliance worn which will serve as a reminder against faulty attitudes. Gymnastic treatment should then be commenced and carried out thoroughly.

An efficient substitute for removable plaster jackets can be furnished by sole-leather and paper jackets. Both of these are moulded over plaster moulds taken from plaster jackets applied in the well-known Sayre method to a patient brought into the rectified position by suspension with lateral correction in addition, when practicable.

If the mould is shaped and shaved, as recommended by Dr. Barstow, of Buffalo, an efficient corset can be made, from which pressure can be exerted upon the points where pressure is desirable. Sole-leather softened by water can be stretched over the plaster mould, and when hardened by drying gives a corset of sufficient stiffness to maintain the patient in a rectified position, or nearly so.

Paper jackets have been used by Dr. Weigel, of Rochester, and will be found to be efficient and light, and capable of being made by any surgeon after a little practice.
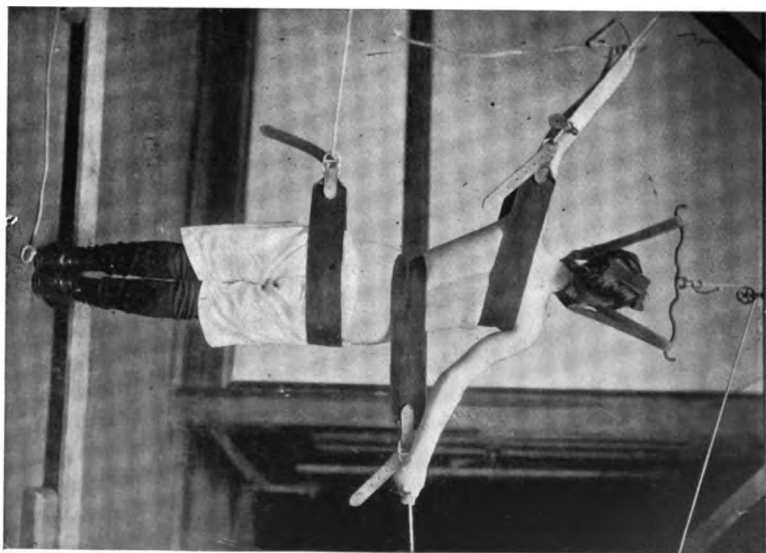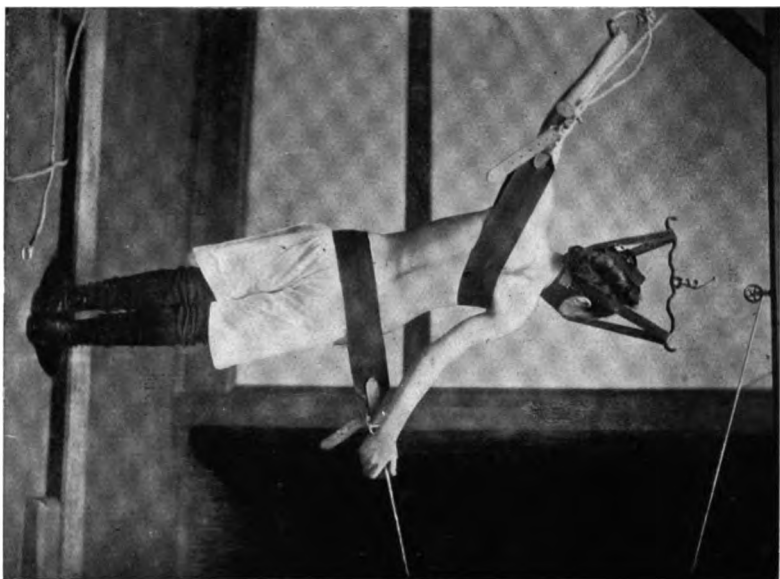
Figs. 17 and 18.—Self-correcting exercises.

The plaster mould is thoroughly dried and shellaced, and over this a layer of thin moistened crinoline gauze is laid, over this strips of

FIG. 19.
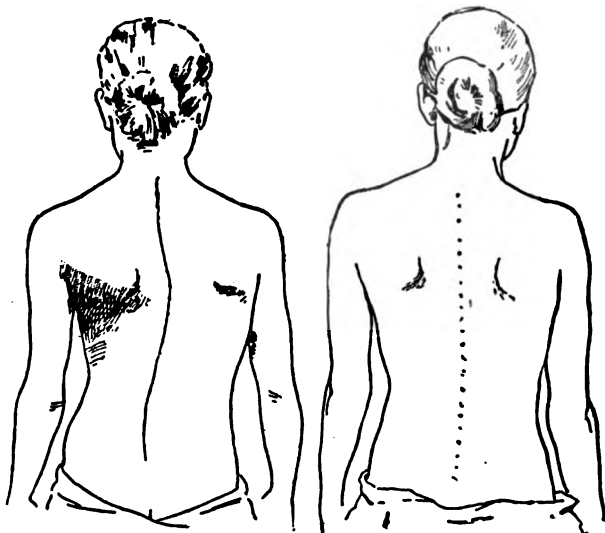
Girl of twelve. Case of fixed rotary lateral curvature before and after four months' treatment by means of forcible correction, and permanent jackets applied in a rectified position.

FIG. 20.
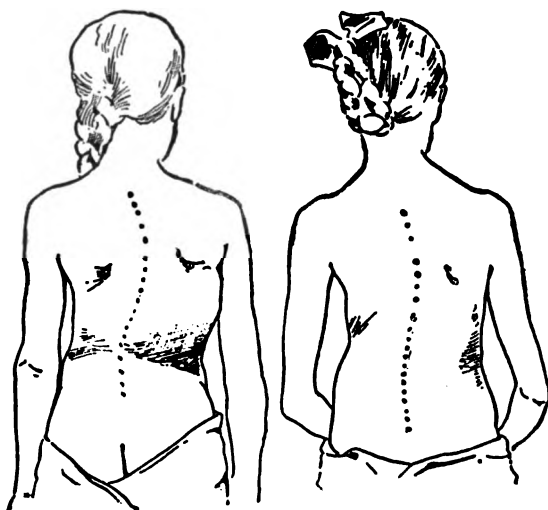
Girl of thirteen. Case of fixed rotary lateral curvature before and after six months' treatment, similar to that in Fig. 19.

printers' matrix paper are pasted, using the ordinary thick flour paste. After two layers of paper are pasted a layer of gauze is used, and again

two layers of paper, until six layers of paper and four of gauze have been applied. The jacket is then dried, cut off the mould, trimmed, the edges bound, and lacing-eyelets applied, and it is ready for use.

Other more expensive forms of corset appliances can be used; but these mentioned have the advantage of rendering the surgeon independent of the instrument-maker, being readily furnished and efficient.

Cases of lateral curvature need to be under observation during the period of growth, and treatment when required needs to be persistent. Suitable cases in growing children or adolescents will give most satisfactory results, and will reward the painstaking care of the surgeon.
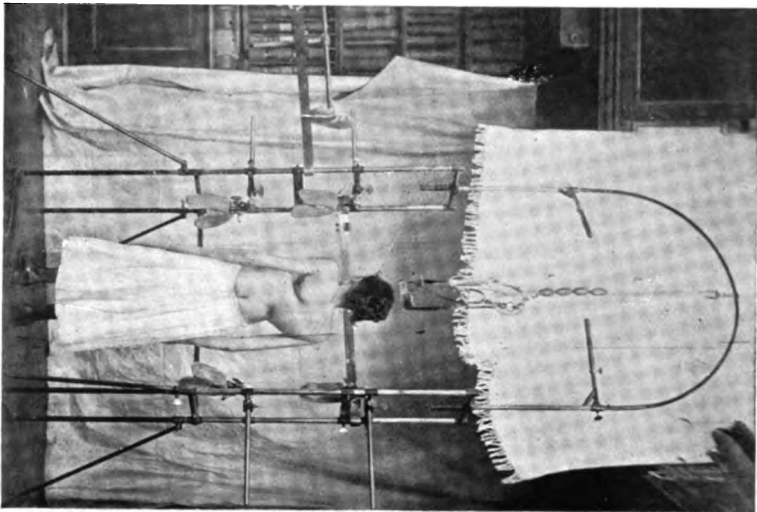
Fig. 21.—Apparatus for correcting rotary lateral curvature of the spine.
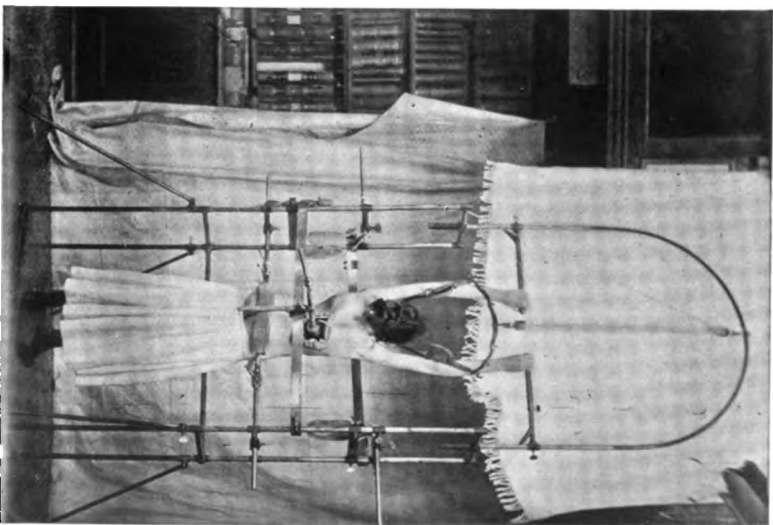
Fig. 22.—Apparatus applied to a patient with rotary lateral curvature of the spine.

SOME COMMON AFFECTIONS OF THE TOES.

CLINICAL LECTURE DELIVERED AT ST. GEORGE'S HOSPITAL.

BY WARRINGTON HAWARD, F.R.C.S.,

Surgeon to St. George's Hospital, etc.

GENTLEMEN,—You have often heard me say that the commoner an ailment the more worthy is it of study; and although rare and complicated diseases requiring unusual treatment have an interest of their own, yet the diseases which we are constantly meeting with in every-day life are really those which will most repay our attention. I propose, therefore, to-day to devote my lecture to some common but very troublesome affections of the toes, and to begin by descending even so low in the body as the great toe-nail.

Sir Benjamin Brodie, fifty years ago, in a lecture on corns, pointed out that the results of civilization were not always and altogether admirable; and I am afraid that it must be admitted that, in spite of the advance of knowledge and education, the tyranny of fashion still has a wide and indisputable sway. Among the products of progress the bootmaker is certainly not an unmitigated blessing, for, being guided by fashion rather than by a knowledge of the anatomy and function of the foot, he is in the habit of making boots and shoes of a shape inevitably calculated to produce various deformities of the toes.

The most notable error commonly met with in the shape of boots is that of making the anterior third of the boot (the part corresponding to the toes) too narrow, and with its outline sloping forward on either side to a point midway between the outer and inner margins (Fig. 1).

But in the natural condition of the foot the great toe is in a nearly straight line with the inner border of the foot; so that a boot which is narrowed towards the point by the sloping outward of its inner border is incorrectly made, and must necessarily thrust outward the great toe. This is easily seen by comparing the outline of the fashionable boot, shown in Fig. 1, with that of the natural foot, the sole of which is carefully represented in Fig. 2. Hence arise various deformities and troubles, to some of which I will call your attention.

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First, there is the *ingrowing toe-nail,* of which we have an example in the case of M. M., a young woman now in the Drummond Ward. The condition is usually produced by the pressure of the outer edge of the great toe against the second toe, whereby the lateral border of the nail is provoked to grow into the adjacent skin, where it is a cause of great irritation. The skin first becomes inflamed and tender, then ulcerates, and subsequently, from the ulcerated surface, there springs up a prominent mass of granulations which overlap the edge of the nail.

These granulations are exceedingly painful and sensitive, and with the surrounding inflammation are a source of great distress in walking, so that lameness and even total inability for active exercise may result.

Fig. 1.

Fig. 2.

Outline of fashionable boot.

Natural foot.

Anything which interferes with exercise may indirectly lead to much deterioration of health, and this somewhat trivial affection, the ingrowing toe-nail, may thus acquire a serious importance. In the case of the girl now in the hospital it had another disastrous effect, for it prevented her gaining her livelihood. She is a teacher of music, and for some months the toe-nail had given her so much pain that she was unable to go from one pupil to another, and had to give up her work. Although the outer edge of the great toe-nail is the usual situation of the ingrowth, yet the inner edge sometimes grows in, and the nails of other toes are occasionally affected. Sometimes the condition appears to be the result of injury rather than of the shape of the boots, and sometimes it is combined with another disease, of which I will presently speak, the subungual exostosis.

The *treatment* must depend upon the extent to which the nail is dis-

eased. If the duration and extent of the suppuration have led to necrosis of the nail, or if the nail is so greatly altered or diseased as to be an inevitable source of irritation, the first step in the treatment must be its removal.   In doing this, great care should be taken to insure the extraction of the entire nail, and especially that no fragment is left at the corners of the proximal border.   The patient being placed under the influence of an anæsthetic, one blade of a strong pair of necrosis forceps should be thrust under the nail down to its root, the second blade then closed tightly upon it, the nail loosened by moving it laterally, and finally lifted carefully out of its matrix and extracted.   Then the granulations at the edge and about a quarter of an inch of the skin along the whole border of the matrix should be cut away, the raw surface dusted freely with iodoform, and the toe wrapped in carbolized wool.

The iodoform dressing should be, continued till the toe is healed, and when shoes are resumed the affected toe must be kept apart from the rest by a wedge of felt introduced between them.

If, however, the nail is not materially diseased it is better not to remove it: not only because the removal of the nail does not necessarily cure the disease,—for the new nail often follows the mode of growth of the old,—but also because the violence done to the matrix frequently leads to a thick, uneven, and irregular growth of the new nail, which, even if its ingrowth be prevented, may be a source of considerable discomfort.

In slight cases of no long duration it may suffice to pack fine shreds of lint under the corner and edge of the nail in such a manner that the ends of the strands lap round the ingrowing border of the nail, along which boracic acid powder is to be dusted daily.

In the more severe cases in which sensitive granulations overlap the border of the nail, the treatment which I have found most successful is the introduction of a piece of thin sheet-lead beneath the ingrowing edge of the nail.

This is done in the following manner.   The patient being under the influence of an anæsthetic, the granulations and adjacent margin of skin are cut away as described when the nail was removed ; then a director or a small bone spatula is thrust beneath the edge of the nail down to its root.   The ingrowing edge of the nail being thus lifted slightly from its bed, a strip of thin sheet-lead is passed down between the director and the nail.   One edge of the lead should project about a quarter of an inch beneath the nail, the other or free edge being turned over onto the upper surface of the toe-nail, to which it is accurately moulded.   The lead is then cut off to the length of the nail, iodoform dusted over the

part from whence the skin has been cut, this covered with a little carbolized wool, and a strip of plaster applied to keep all in position. In many cases the patient is able to walk at once without discomfort; but in the more severe forms it is preferable to rest the foot for a few days, and until the suppuration along the margin of the nail has come to an end. Then the iodoform and wool may be discarded and the border of the nail simply powdered with boracic acid, the toe covered with a piece of kid like the finger of a glove, and a wedge-shaped piece of felt placed between the first and second toes.

Fig. 3 represents the great toe-nail with a strip of lead introduced

FIG. 8.
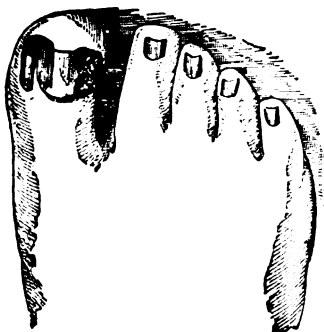
Applications for the relief of ingrowing toe-nail.

beneath its inner edge, while the outer edge, which is also growing in, is overlapped by granulations. A wedge of felt is placed between the first and second toes. As the nail grows, it should be cut in a straight line at right angles to the border of the toes, the lead being gradually shortened until all that part of the nail which has grown in has come to the free margin and been cut off. The wedge of felt should be worn for a longer period, and the nail always kept with its free edge cut rectangularly, the corners never being sloped off.

Another disease affecting chiefly, but not only, the great toe is the *subungual exostosis*. This is a small growth of cancellous bone from the ungual surface of the last phalanx which pushes up the nail and causes much discomfort. The bony tumor is covered with a thin layer of cartilage, and it sometimes grows from one side of the bone, tilting up the nail on that side, and causing the opposite edge of the nail to grow in. Thus there may be the combined inconveniences of an ingrowing toe-nail and a subungual exostosis. Sometimes the growth is a sarcoma; and I have recently seen one, of the size of a filbert, beneath the nail

of the second toe.   This last variety necessitates amputation of the toe; but the ordinary small, simple exostosis may be chiselled off the bone after the nail has been removed, care being taken to excise completely the base of the tumor.   The dressing may be of the same kind as that used after removal of the toe-nail.

I now pass to the consideration of a common and troublesome deformity of the toes, usually called *hammer-toe*, of which you have lately seen several well-marked examples in the hospital.   In this condition, one or more of the toes are retracted towards the metatarsus and bent at an angle at the first interphalangeal joint.

The first stage in the production of this deformity is the hyperextension or retraction of the proximal phalanx of the toe.   This I have repeatedly demonstrated by an examination of cases in the early stages, in which the extensor tendon can be seen and felt, on the dorsal surface of the toe, rigidly contracted and standing out prominently under the skin over the metatarsal bone and base of the phalanx.   The flexor tendons, on the contrary, will be found quite uncontracted.   Then there ensues upon this a flexion of the second phalanx so as to bring the toe to the ground.   This position throws undue weight on the end of the toe, whereby the last phalanx is extended on the second, and the skin of the tip of the toe becomes greatly hypertrophied and the nail thrust upward.

The projection above the level of the adjacent toes of the first interphalangeal joint leads to pressure by the boot upon its dorsal surface, to hypertrophy of the skin, and the formation of a corn with a subjacent bursa.   It is the inflammation and ulceration of this corn and bursa which give rise to the pain and lameness accompanying the deformity, and it is for this that the patient usually seeks advice.

The annexed illustrations are from drawings kindly made by my friend and former dresser, Mr. G. H. Goldsmith, and accurately represent two well-marked specimens of the deformity.   I have dissected a large number of hammer-toes of variable degrees of severity, and have found that they all show essentially the same abnormal conditions. Some of these have been placed in the museum of the hospital, and it will be seen that the specimens have been prepared in various ways, the better to display the changes in the individual parts and structures concerned.

Fig. 4 represents a dissection in which the characteristic features of a hammer-toe are well shown.   It will be seen that the skin at the tip of the toe (*e*) has been left on to show its great hypertrophy and the thrusting upward of the nail (*f*).   The first phalanx is in a state of hyper-

extension. The second phalanx is flexed on the first at nearly a right angle, and the ungual phalanx with its thickened skin is pushed upward, or extended on the second. The extensor tendon (*a*) is shortened. The flexor (*b*) is seen following the arch of flexion. The lateral ligaments

FIG. 4.
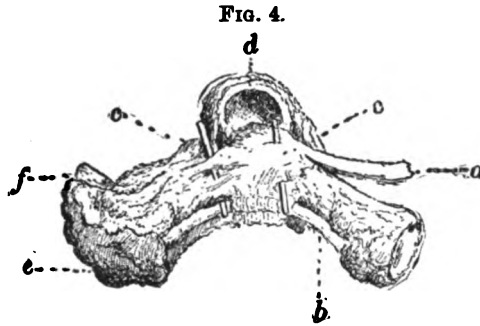
The pathological anatomy of hammer-toe.

(*c, c*) are shortened. The plantar ligaments show no material change. Over the first interphalangeal joint is seen the thickened skin or corn (see also Fig. 5, *d*), beneath which is the bursa which has been laid open to show its cavity (Fig. 4, *d*). In Fig. 5 a section has been made of the

FIG. 5.
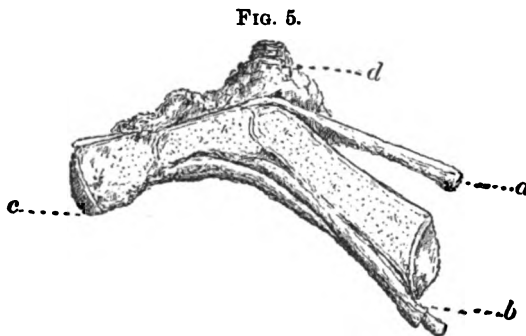
Longitudinal section through the diseased joint.

bones, and the articular surfaces of the first interphalangeal joint are seen to be somewhat altered in shape by the pressure of flexion. It will also be observed that the articular surface of the second interphalangeal joint is altered in a manner which shows that the ungual phalanx had been in a position of hyperextension; though this is not shown in the dissection (the sawing of the bone having pushed it down), it had been observed before the amputation of the toe.

The causes of this curious deformity are obscure. In some instances no doubt it is produced by wearing too narrow boots, so that

the first and fifth toes are thrust beneath the second and fourth, which are thus pushed upward and backward towards the metatarsus. In others, again, it is the result of wearing boots which are too short or which have high heels. But in the majority of cases the deformity is not caused, although it may be aggravated, by misshapen boots. It is often related to some disturbed condition of the nervous system, and is especially common in neurotic young women with bad circulation.

It is, moreover, frequently hereditary, and can be traced through several generations.

In one of the cases in the hospital, a boy of fifteen years, his grand-mother, his father, two brothers, and a sister all exhibited the deformity, and in each the same toe was affected. When, as is frequently the case, one toe only is affected, it is almost always the second. It was so in the family just alluded too.

The *treatment* must depend upon the degree of severity exhibited. In long-standing cases, in which bad corns have formed over the knuckle of the toe or ulceration of the bursa has occurred, the best and simplest mode of relief is to amputate the toe. In less severe cases, and before the corn has ulcerated, excision of the articular end of the proximal phalanx gives a good result. A semilunar flap of skin is turned back to give access to the joint, and the corn can be excised at the same time. In still slighter cases, division of the extensor tendon, the lateral ligaments, and any contracted bands which oppose the straightening of the toe will suffice, the toe being kept for a time upon a splint and afterwards subjected to daily manipulation.

Let me now direct your attention for a few minutes to another of the minor ills for which our modern civilization is responsible, and which is the cause of much misery,—the *common corn*, usually met with upon the fifth toe. A corn may form over any prominence of bone covered by skin which is subject to intermittent pressure, but for obvious reasons is chiefly seen upon the toes. It consists of a localized thickening of the epidermis at the expense of the cutis and subcutaneous fat ; it is usually of rounded outline, and thicker in the centre than at the circumference, so that when the corn is separated by maceration a conical hollow is left in its place. Beneath the hard and thickened epidermis and the atrophied cutis a bursa is eventually formed (see Fig. 4, *d*), and it is the inflammation of this bursa which is the chief source of the pain to which corns give rise.

Doubtless corns on the feet are mostly caused by wearing boots which are too small, and especially by boots which are too narrow, so that corns usually appear first upon the outer side of the fifth toe.

But boots misshapen in any way which produce undue pressure on bony prominences, or which crowd together or double under the toes, will cause corns. And it must be admitted that some persons are born with a predisposition to corns, so that even the most moderate pressure will produce them, and thus children will sometimes suffer from corns soon after they begin to wear shoes.

Besides the ordinary hard corns, soft corns are met with between the toes, especially of those whose feet are habitually moist. They differ from the hard corn chiefly in having a looser and softer structure, and in their greater vascularity and sensitiveness. Moreover, they are often superficially spread or pressed out into a mushroom-like shape.

A painful corn, besides the discomfort which it produces, may give rise to other evils. It may cause lateral curvature of the spine and other irregularities of muscular action by the effort of the sufferer to throw the weight of the body away from the painful side of the foot. It may interfere with exercise, and thus with digestion and health. And you have lately seen in the hospital an instance of acute cellulitis of the foot having its origin in suppuration of the tiny bursa beneath a corn on the outside of the fifth toe.

For the *treatment* of the ordinary hard corn, the first essential is to get rid of the pressure which causes it, and to see that the boots are of proper shape and size. Then the corn should be painted over with glacial acetic acid daily until the cuticle can be peeled off easily. This should be repeated till the thickened cuticle has been removed, and then the site of the corn protected from pressure by applying a horseshoe-shaped piece of adhesive felt around three-fourths of its circumference. This is better than the circular corn-plasters sold for the purpose, which allow the corn to bulge into the central hole. If a corn becomes in-flamed, the foot must be rested and a lotion of lead and opium applied. If suppuration occurs, a process attended usually with acute pain and some œdema of the adjacent skin, the foot should be soaked in warm .water, so as to soften the skin round the corn, and then a small knife, with the flat of the blade held on a plane corresponding to the surface of the corn, should be passed under the thickened cuticle and into the bursa. This will give exit to the few drops of pus contained within the bursa, and at the same time the hard epidermis should be raised from the tissues beneath. Warm boracic fomentations should then be applied, and after a few days the corn can be completely removed.

The exit of the pus (or it may be of serum which has not yet be-come purulent) is followed by immediate relief to the pain; but if the little bursa is not opened, tension becomes great and inflammation is

very apt to spread to the surrounding cellular tissue, and even to give rise to an acute cellulitis of the foot. Sometimes troublesome ulceration of a corn is left after suppuration of the bursa, and this may, if neglected, extend to the deeper tissues and even to the subjacent joint. This condition you must not confuse with the "perforating ulcer of the foot," which occurs on the plantar surface, and is attended with anæsthesia of the adjacent skin and other signs of nerve lesions. Ulceration of an ordinary corn is best treated by scraping away the surface of the ulcer and dressing it with Peruvian balsam or with iodoform. Perfect rest of the foot should at the same time be maintained, and the condition of the circulation and general nutrition attended to.

In old people, and especially in those with advanced degeneration of their blood-vessels, corns should be treated with great caution, and any cutting operation, if possible, avoided, for unskilful corn-cutting has in many aged people been the origin of senile gangrene.

Soft corns between the toes are best treated by dusting them freely with oxide-of-zinc powder and separating the toes by a piece of felt. If this does not cause them to shrivel and drop off, the application of acetic or nitric acid will do so. Persons whose feet perspire and who have a tendency to soft corns should sprinkle powdered boracic acid between the toes and over the feet before putting on the stockings, and should avoid "patent-leather" boots.

One other distortion due to wrongly-shaped boots I must speak of before leaving the subject,—namely, that very common and troublesome condition called *bunion*.

This consists of a displacement outward of the phalanges of the great toe, whereby a partial dislocation takes place at the metatarso-phalangeal joint, and the head of the metatarsal bone is left unduly prominent on the inner side of the foot. The pressure to which the head of the metatarsal bone is thus subjected gives rise to a bunion,—that is, to a thickening and induration of the skin over the bony prominence, and the development of a bursa between the skin and the joint beneath.

As the distortion increases the phalanges of the great toe are thrust beneath those of the adjacent toes, which are thereby pushed upward and backward, the internal lateral ligament of the metatarso-phalangeal joint becomes elongated, and the extensor muscle shortened.

After a time, and especially in those of a gouty or rheumatic tendency, the head of the metatarsal bone often becomes enlarged and altered in shape and the articular cartilage partially absorbed. The

movements of the joint are thus greatly restricted, the elasticity of the foot is impaired, and much suffering caused by the frequent recurrence of inflammation of the bursa.

For *treatment*, in slight and early cases of bunion, the tendon of the extensor proprius pollicis should be divided and the toe straightened during the influence of an anæsthetic. A splint must then be applied to keep the toe in position, and this must be worn till all pain and inflammation have subsided. Then the patient may be allowed to walk, wearing boots with a straight inner edge and with a septum between the first and second toes, digitated stockings being of course also necessary. The various springs, splints, and other apparatus which have been devised for the purpose of drawing the great toe towards its proper position, while walking is still permitted, are of but little use, and are mostly productive of more discomfort than benefit. The severe cases which are not amenable to the measures above described are best treated by excision of the metatarso-phalangeal joint. You have recently seen two examples of this operation, one by my house-surgeon and one by myself, the results of which were completely satisfactory.

You see, then, gentlemen, that much can be done to remedy the pains and penalties attendant upon the frivolities of fashion; but remember that in this, as in many other similar conditions, "prevention is better than cure."

GUNSHOT WOUND THROUGH THE UNMAPPED PORTION OF THE FRONTAL LOBE OF THE BRAIN; CASTRATION FOR ENLARGED PROSTATE; CASTRATION FOR VIOLENTLY IRRITABLE TESTIS; SARCOMATA TREATED BY TOXINES.

BY EDMUND ANDREWS, AM., M.D., LL.D.,

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GENTLEMEN,—This patient has just been brought in with a pistol-shot passing transversely through the frontal lobes of the brain. The history given is that he has been for some time slightly insane, and to-day he took a 32-calibre pistol and fired it into his right temple. His head having been shaved and disinfected, we will proceed to inspect the wound. Cutting down to the bone, we find a ragged opening in it, filled with a clot of blood, and the probe shows splinters of bone on the inside. Enlarging the opening, I draw them out. Also I remove the clot, and a gush of liquid blood escapes, bringing with it blood-clots and pieces of brain, and probably bits of skin, hair, and bone. The bullet has entered the middle of the side of the frontal lobe, and passed transversely on towards the opposite side. Turning the head, let us examine the opposite temple. Here is a small dome of bone to be felt beneath the temporal muscle. Cutting down upon it, I find a small protuberance of broken pieces of skull, which I remove, and here we find the bullet just within. I draw it out, and again there is a gush of venous blood, sweeping with it coagula and fragments of brain-tissue. The blood soon ceases to flow. The bullet has traversed almost directly across through the middle of the frontal lobes, entering on the right side and emerging on the left, just in front of the cerebral tract assigned by authors to the motor functions of the organs of speech. If you look at this sketch-map of the localized functions of the brain, you will see that the bullet has traversed an unmapped portion, an unexplored region, whose functions are unknown.

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If this patient survives a few days, we will watch closely and see what function of the brain is injured, and thus, perhaps, throw some

FIG. 1.
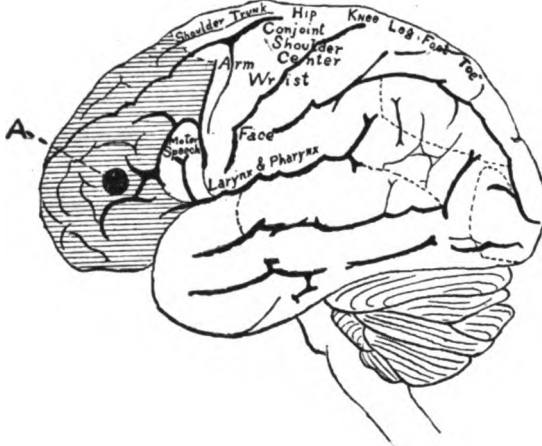
Map of the known cortical centres of the brain. The round mark, A, shows the exit of the bullet just in front of the motor speech centre. The shaded portion shows the unmapped frontal lobe, whose functions are unknown.

FIG. 2.
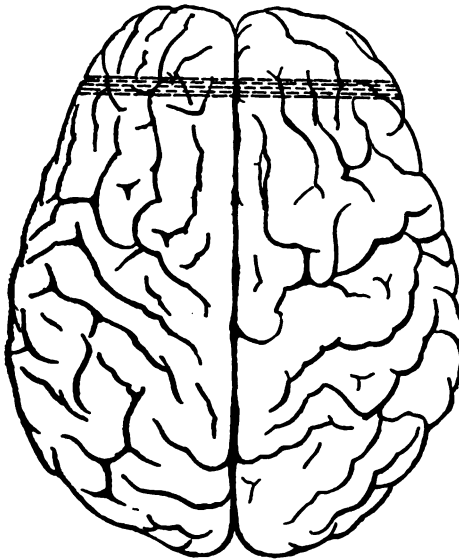
View of the upper surface of the brain. The shaded belt shows the track of the bullet through the frontal lobes.

light on the uses of the frontal lobes. The wounds will now be dressed antiseptically and the patient returned to his bed.

Subsequent History.—The next day the patient had recovered from his mild cerebral concussion, talked rationally, but a little slowly, as if inattentive. There was no impairment of any motor sensation, special sense, or mental function. He was a little restless, and walked about the ward when permitted. He remained in the hospital eleven days, without my being able to detect any effect of the wound on the mind or on any bodily function. The effort to discover anything to add to the functional map of the frontal lobe was a total failure. On the eleventh day he went home, with his wounds rapidly healing.

CASE II.—Within the past year or two a few cases have been reported of the cure of enlarged prostates by castration, just as in women removal of the ovaries reduces certain uterine tumors.

I operated on a case of this sort in your presence last year, and I now bring him before you again to report the final result.

This patient is about seventy-six years old. At the age of fifty-six he found the prostate gland to be so much enlarged that the catheter was necessary to evacuate the urine, which he attended to himself, he being a highly educated physician. To remedy the obstruction, he tried at my suggestion the " moulding" plan introduced by French surgeons. He inserted daily an olive-pointed bougie of the size No. 18, English scale, and allowed it to remain a few minutes, in order by its pressure to cause absorption at the neck of the bladder, and thus form a sulcus or notch in the obstruction sufficient to allow the urine to escape. This plan gave great relief, but only temporarily. The " moulded" parts seemed always to return to their obstructive shape unless the bougie was inserted every day.

Very early in the case cystitis set in, accompanied with great pain, and though he diminished both the inflammation and the distress by irrigations with boric acid, he could not fully subdue them, and he had not a day free from pain for twenty years. After a time he began to have frequent repetitions of orchitis, with such severity as to confine him to bed.

As Moullin, of London, Ramm, of Sweden, White, of Philadelphia, Haynes, of California, and Fremont Smith, of Florida, had reported a few cases in which the removal of both testicles had brought about a complete cure of enlarged prostate, just as excision of the ovaries induces atrophy of fibroid tumors of the uterus, I determined to operate, with the double object of stopping the exasperating orchitis and of putting an end to the prostatic obstruction. I therefore performed a double castration in your presence.

The effect was remarkable, and in one respect totally unexpected.

Not only was the distressing orchitis immediately cured, but the cystitis, with all its pain of twenty years' duration, promptly ceased, and has not returned. So far as I know, no writer has mentioned that castration may cure cystitis, and hence this result caused me great surprise. The reason of it may be twofold. First, the diseased testes were, doubtless, transmitting septic microbes through the vasa deferentia to the prostate and to the neck of the bladder, and the castration cut off the supply of infective material. Secondly, the removal of the testes may have taken away a constant and irritating nervous reflex.

Some months have now elapsed, and the prostate gland is already considerably reduced in size, and probably will continue to grow smaller.

The effect on the sexual function was this. Owing to his age, his power of erection and passion were already considerably reduced, and the operation has abolished the remainder of both. One symptom has appeared which is similar to those spoken of in women who have passed the turn of life. Hot flashes appear at irregular intervals, beginning with a gentle warmth all over the body; they then increase with a flush in the face, and finally terminate in a free perspiration over the whole body, especially the face. He describes the sensation as singular and very remarkable.

If it shall turn out that senile cystitis is curable generally by removal of the testes, it will be in many desperate cases a most valuable remedy. I think it is well worth the trial, for castration is a far milder operation than cystotomy or prostatectomy.

CASE III.—This is another case of castration which I formerly laid before you, and whose history I wish now to complete, the more so because the literature of the subject is excessively meagre. The patient had for many years most violent attacks of what used to be called "irritable testis," or, more correctly, hyperæsthesia of the testis. I have examined over thirty prominent authors, from Sir Astley Cooper, of England, onward to Tillman's new German work, without finding one single good description of this disease. The reason of the deficiency seems to be that the patients, in spite of all their suffering, do not die, and consequently specimens for accurate study are not obtainable.

This patient, when twenty-one years of age, contracted some venereal disease, probably gonorrhœa. It caused severe pain and excessive tenderness in the right testicle, lasting him three months. Some years later he developed an inguinal hernia on the same side, whose increase he checked by wearing a truss. At the age of fifty another attack of pain and frightful tenderness of the testis and cord supervened, which

rendered it impossible to tolerate a truss, and kept him in bed thirteen months and from labor two years.   At a later period he had la grippe complicated with a return of the tenderness of the gland without any swelling.   He was treated by Dr. H. W. Vanderhoof, of Chicago, and gradually got better.   In the spring of his sixty-eighth year of age he was sent to bed by a most violent attack of his disease, without fever or swelling.   After sixteen weeks in the horizontal position, without relief, Dr. Vanderhoof requested me to see the case with him.   We found the testicle and cord so sensitive that the slightest touch of the finger was intolerable, yet the organ was not swollen, but, on the contrary, smaller than the other.   When he was anæsthetized, it was not found any harder than normal.

Although almost all authors condemn castration in these cases, yet I differed from them, and determined to remove the testicle, and at the same time operate for radical cure on the hernia.

As you remember, I opened the whole length of the inguinal canal, ligated and removed the hernial sac, ligated and cut off the spermatic cord high up, and took away the testicle.   I then treated the hernia by Bassini's method,—that is, I stitched the border of the internal oblique muscle and the edge of the transverse fascia down to the border of Poupart's ligament with kangaroo tendon, and closed the wounds in the oblique fascia and integuments.   As the cord was removed, Bassini's method was of course not fully applied to it.   The pain and tenderness ceased completely and at once, and the wound healed without a drop of pus, but a brain complication, which had long existed, became more obvious as soon as he was relieved from pain.   Dr. Vanderhoof had noticed for months that his mind was not entirely rational. He was irritable, and occasionally had slight hallucinations.   The brain-disease was not benefited by the mere relief of his suffering, but grew steadily worse, and finally terminated his life about a month after the operation.

The removed testicle, though small and soft, showed that it had formerly been seriously diseased.   The tunica vaginalis was firmly adherent to the gland, and a spot of adhesion to a scar on the scrotum showed where a former abscess had broken.

Most authors confound these cases with neuralgia, but they are essentially different.   My opinion is that there is always a local organic disease, though it may sometimes be only a neuritis.   True neuralgia of the testicle is different.   The gland is not sensitive to a firm touch, and the seat of the disease is in some point affecting the nerves higher up.

The causes of irritable or hyperæsthetic testicle are,—

1. Local inflammation.
2. Neuroma, especially *tuberculum dolorosum.*
3. Neuritis in the testicle and cord.
4. Incipient carcinoma.

The treatment should be first to subdue local inflammation and abate the irritation of the part in every possible way; but if these fail, and the disease persists so as to destroy the happiness and usefulness of life, then extirpate the gland, cutting off the cord high up in the inguinal canal. As the other testicle is usually sound, the patient does not become sterile nor impotent. The authors are against me, but I think I am right. I think the cases of recurrence after castration given by MacCulloch, Romberg, and Berger were not true local irritable testis, but cases of neuralgia, which they, like most authors, had confounded with this disease. In neuralgia, the real disease being higher up, a castration would avail nothing.

CASE IV.—During the last two years efforts have been made with apparent success to cure malignant tumors, especially sarcoma, by the toxines of the microbes found in erysipelas, especially of streptococcus erysipelatosus and of bacillus prodigiosus. Up to the present time we have not been able to obtain the degree of success quoted by Professor Coley, of New York, though using the toxines made in Loomis's laboratory of that city. Still, we do not despair, though we may be a little discouraged. I show you two cases of very large and unpromising sarcomata which we have under treatment. The first of the two got a contusion of the thigh a year ago, and six months later developed a sarcoma at the bruised spot. When it was four inches in diameter it was excised by my friend Dr. Kittoe, of Galena, Illinois. In spite of his thoroughness, the disease returned, and in four weeks attained a diameter of eight inches, as you here see. It is located on the upper part of the thigh, in a situation where a thorough removal would require an amputation at the hip-joint, besides a removal of large areas of tissue above Poupart's ligament. The patient

FIG. 8.
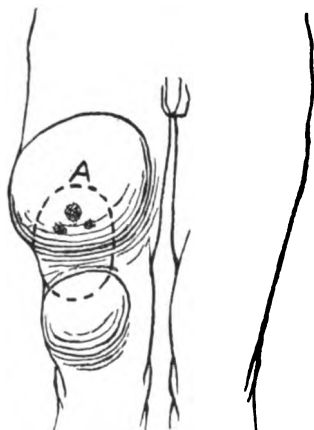
Large sarcoma, which recurred in two places after operation. The dotted oval, *A*, outlines the scar left by the healing of the incision by Dr. Kittoe.

is feeble, has heart-disease, and is seventy-three years of age. I do not think he would survive the operation. We will therefore give him the toxines. I begin with two minims inserted into the tumor with a hypodermic syringe.

[The subsequent history of the case was this. Two minims produced a sharp chill and fever. Gradually he acquired more toleration, but could never bear more than five minims. He grew gradually weaker, but the tumor, which had been developing with great rapidity, ceased to grow, and measured for four weeks about the same. Ulcerated spots appeared upon it, through which the sarcomatous tissue had a gangrenous look.

Owing to his debility, the toxines were discontinued a few days, but on the sixth day after the withdrawal of the injections he suddenly died of his heart-disease.]

CASE V.—This also is a very large sarcoma, situated in the abdominal cavity, and arising from the iliac fossa. The patient has been mostly under the skilful care of Dr. J. E. Smith, of Mauston, Wisconsin. The toxines were at first inserted into the connective tissue over the tumor. They had no effect on the growth, and were then injected into the tumor itself at points not covered by peritoneum. The patient had chills like the previous one. At the end of several months an abscess developed in the interior, which on being opened poured out a great quantity of pus, and, the finger being inserted, discovered masses of gangrenous tissue of the tumor. Antiseptics were used freely, but the

FIG. 4.

Large sarcoma of the abdomen. The position is shown by the dotted outline.

strain was too great for the patient's strength, and death ensued from asthenia. So far as these two very unpromising cases go, they seem to show that very large sarcomata have not much chance of cure by this treatment, but that perhaps smaller ones would do better.

THE DIAGNOSIS OF MALIGNANT TUMORS.[1]

BY DAVID HANSEMANN, M.D.,

Privat docent at the University of Berlin.

GENTLEMEN,—There has never been a doubt as to the great impor-
tance of diagnosing tumors as early as possible, and no efforts have been
spared in order to discover signs whereby we might be enabled to tell at
the outset whether a tumor is benign or malignant. An early diagnosis
of this kind is apt to determine grave consequences, for if we fail to
recognize the malignant nature of a tumor the proper time for operating
may be allowed to pass. On the other hand, a mistake in regard to the
quality of a benign tumor may needlessly expose the patient to a severe
and often mutilating operation.

In spite of the great development of our clinical methods for diag-
nosing tumors, there remain a number of cases that repeatedly give
rise to uncertainty, and where, even when ocular inspection is possible,
a sure diagnosis cannot at first be established. As a rule, it is in regard
to certain typical spots that such doubts are continually occurring. This
may be said in general of the various bones of the body, of the superior
portion of the respiratory and digestive tracts, of the anus, the vagina,
and the vaginal portion of the uterus. Hereto must be added another
class not subject to any particular localization,—namely, certain kinds
of syphilitic tumors. In spite of the most careful inspection, you will
frequently find yourself unable in such cases to arrive at the right diag-
nosis; yet a diagnosis must be established under all circumstances, un-
less you wish to expose yourself to reproof. What are you to do in
such a case?

An old man consults you for pains in his tongue, preventing him
from eating, and thereby interfering with nutrition. He appears to
have lost flesh, and gives the impression of being in poor health gener-
ally. Upon examination you find a painful spot on his tongue. Also

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[1] Reported by H. Cleves-Symmes, M.D.

an ulcer about three-fifths of an inch in diameter. Its margins are puffed out, rough, and with irregular protuberances. The surrounding tissue feels hard. You further perceive, corresponding to this spot, a carious molar tooth with sharp edges. You draw this tooth, yet the ulcer does not show any tendency to heal; it even grows larger. Now it occurs to you that carcinoma may result from continuous local irritation, as in the lower lip from the habit of smoking a pipe, and you are likely to take this for a carcinoma produced by irritation through the carious tooth. If this ulcer really were carcinoma you would be obliged to perform an extensive operation that would seriously interfere with the man's power of articulation. Now, you must consider that tubercular ulcers also may occur in the tongue, with thick and ulcerated margins and solid infiltrations of the surrounding tissues. The first thing you do, therefore, should be to examine the lungs for tuberculosis. However, you do not find anything characteristic; you fail to detect tubercle bacilli in the sputum. You take some of the secretion of the ulcer,—in which, by the way, no tubercles are visible,—but you are unable to find any tubercle bacilli therein. If you were now to establish with assurance a diagnosis of carcinoma, you would be liable in many cases to commit a fatal mistake. You first from the margin of the ulcer excise a small piece for examination by the microscope. There you find hypertrophy of the mucous membrane, you find infiltration of the connective and the muscular tissue, and, deeply placed, you see typical tubercles with giant-cells. If you now proceed to stain your sections for tubercle bacilli, you may have to search a long time before finding any, as they are sometimes very sparsely distributed. That is how you arrive at a sure diagnosis in this case.

Occasionally it is even more difficult to distinguish between lupus and carcinoma of the mucous lining of the mouth, when there is no ulceration and much hypertrophy of the mucous membrane.

Let us now consider another case. A patient in younger years or in the middle of life comes to consult you. He complains of an ever-increasing nasal obstruction. On examination you find in the upper part of the nose a broad-based prominence covered with mucous membrane. At first you take this for a polypus. You remove it, and believe the case cured. However, a short time elapses and your patient returns with his old complaint, and you find the same state of affairs. Well, polypus is apt to return; in fact, such recurrence is by no means rare. Then perhaps you once more excise the growth. This time, though, you cut sections for microscopic investigation, and there, to your surprise, you find a tissue consisting of large spindle-shaped or polymor-

phous cells, and in which you immediately recognize a typical form of sarcoma. Sarcomatous growths of this sort, resembling polypus in the beginning and large-celled, originate, as a rule, in the pterygoid fossa, in the antrum of Highmore, or in the sphenoid sinuses. The rate at which they grow is often very slow, but they finally destroy the jaw-bone, and frequently make their way to the brain through the base of the skull. It is your duty, therefore, to operate as early and as thoroughly as possible, if there is any chance of arriving at the spot where the growth began. An early diagnosis, however, is attainable only by means of the microscope, examination by the naked eye not furnishing decisive evidence, however experienced the investigator.

Let us now pass on to another region,—namely, to the vaginal portion of the uterus. Here, likewise, considerable difficulties may be encountered in arriving at a decided diagnosis. A woman complains of trouble in the abdomen, a feeling of heaviness and of bearing-down pains radiating towards the back and the lumbar region, and, finally, frequent loss of blood. On introducing a speculum you find an enlarged portion presenting an ulcerated surface, of which the margins are somewhat prominent and the base is covered with mucus and some pus, and bleeds readily on contact with an instrument. In some spots vegetations of a slightly polypoid nature start from the ulcer. You may be in doubt now as regards diagnosis. The thought of carcinoma is the first to suggest itself: in that case the entire uterus would have to be removed. There is another possibility, though, of its being a granulating ulcer that has arisen either without any known cause or, in very rare cases, owing to tuberculosis. In both cases it would be sufficient to remove merely the ulcer, or at most the diseased portion. In order to determine what to do you must be able to make a sure diagnosis. Clinical examination does not carry you as far as that. You must cut out a small piece and subject it to examination by the microscope. In the first case you will then find masses of carcinomatous tissue resembling glandular tubuli and penetrating into the deep layers; in the other case a loose granulation-tissue with proliferated capillaries, or genuine tubercles containing giant-cells and tubercle bacilli.

Well, gentlemen, I have mentioned these three examples in order to show you that there are cases where clinical investigation does not lead to a diagnosis, and you have to look to the microscope for help. These examples that I have brought before you do not, however, by any means exhaust all the possibilities. You will come across tumors in the larynx that clinically bear a great resemblance to one another,

though they may be either carcinoma or pachydermatous ulcer, or simple papilla, or hyperplastic tubercular ulcers. In the rectum there occur polypi, syphilitic ulcers, tubercular and simple fistulæ ; in the anus ulcerating warts, all of which are frequently very difficult to distinguish from carcinoma. In all these and in many other cases there is nothing to do but excise a piece of the tissue for microscopic investigation.

I told you before of certain syphilitic tumors which are so important that I wish to give you two illustrations. Here you see before you a young girl of about twenty. Two months before she consulted a physician she discovered a slow-growing tumor along the lower margin of her left scapula. When she was examined for the first time a rather solid tumor of about the size of a goose's egg was found closely adherent to the scapula ; the overlying skin was not ulcerated, hardly flushed. Now, this was either a periosteal sarcoma or it might have been a new formation of syphilitic origin. You know how difficult it is in such cases to get a trustworthy history. When you question a patient in regard to this point he is apt to either prevaricate or indignantly repudiate your suggestion. Or it may happen that both the patient and his relatives are ignorant of the fact that he has suffered from syphilis which he may have acquired in his earliest childhood from a syphilitic wet-nurse. Cases have been known where syphilitic infection was transmitted by a kiss, or in males by the operation of shaving, and where, outside of a small primary induration, noteworthy secondary symptoms were not developed. Owing to these difficulties we were obliged to do without a history, and potassium iodide was given for a trial. This, however, did not cause the tumor to shrink ; on the contrary, it continued slowly growing until it was extirpated. A cross-section showed a grayish-red, rather moist tissue, irregularly sprinkled over with a dry, yellow mass that in part was fairly caseous. Microscopic examination revealed a dense granulation-tissue abounding in cells with moderately-developed vascularization. There was a good deal of fatty metamorphosis, not only among the cells, but also in the interstitial matter ; occasional giant-cells were visible and caseous material containing more fat than is habitually found in tubercles. In short, the microscopical picture was typically that of a gumma, differing from sarcoma by the manner in which the cells had developed into organized granulation-tissue, and by its peculiar fatty metamorphosis. Yet potassium iodide has had no effect, and if you now examine the patient you will find tumors varying in size from a hazel-nut to a pigeon's egg situated in the cicatrix of the

former operation and also along the superior border of the scapula. They present the same clinical features as the original tumor which recurs and produces metastasis. Now, if it were really sarcoma, you would be obliged to largely resect the scapula; if you are convinced, however, of the exactness of your histological diagnosis, on the strength thereof you may confidently confine yourself to enucleating the tumors and administering potassium iodide; later on you may add a course of treatment by inunction. For experience has taught us that late syphilitic growths of this kind are to be cured neither by potassium iodide alone nor by mere extirpation, but solely by a combination of both of these methods. Such tumors may arise in bones, in muscles, in the tongue, and, in fact, any tissue; they are met with most frequently, however, in bones.

The reverse case may also happen, as you will see by the following example. A man, about forty years of age, had acquired syphilis some fifteen years ago. In the interval he had at different periods been suffering from ulcerations of the pharynx. Below the knees he was marked with large white stellated scars, and his left tibia was thickened in a characteristic manner. For some time he had been complaining of pains in the upper end of the tibia. When he was examined, this upper end was found to be thickened and the mobility of the knee-joint diminished. The presence of a tumor was readily recognized, and potassium iodide prescribed in view of the previous history. This failing in its effect, it was decided that the man should be operated upon. The bone was opened with a chisel, and therein a mass of tumor was found of a gelatinous consistency, having undergone a partial fatty metamorphosis. The growth was cleared out so far as possible and a microscopic examination made, the mass consisting almost purely of cells with thin-walled vessels that appeared in some places greatly distended. The cells were large, polymorphous, some of them containing several nuclei with but scanty intercellular substance. Only in some spots was there to be seen a broad hyaline intercellular substance between cystic cells. In short, the typical appearance of chondrosarcoma was presented. Under such circumstances we of course did not wait until a recurrence took place, but we immediately amputated the limb.

However, these examples will do. If we now turn our attention to the details of the histological diagnosis, you will find that it is not always easily established, but frequently gives rise to a great deal of trouble.

Of course, there never will be any difficulty about determining whether tuberculosis is present or not, nor will it be hard to discern in

fully-developed cases that a tumor is sarcoma. The microscopic difficulty is met with where we have incipient forms of tumor to deal with ; where the question arises whether a wart-like growth is or is not carcinoma, or whether an ulcer is carcinomatous or syphilitic, or something else. No amount of experience will avail to arrive at a certain diagnosis, if the particles of an organ furnished for examination have not been prepared and treated in the right manner. You should remember, to begin with, that you must cut out your specimens in such a way as to render them suitable for examination later on. In the case of small tumors, such as warts and similar growths, enough of the base must be removed along with the main body to show the transition into normal tissue. The seat of the tumor should always be plainly marked. Such small tumors are best fixed *in toto* as soon as they have been cut out. A concentrated aqueous solution of the bichloride of mercury is most suitable for this purpose. Small pieces are kept immersed for one hour, then they are put into alcohol. Larger pieces may remain in for two hours, but not longer, or they become too hard and brittle. If they are larger, therefore, one does well to divide them with a double-knife, whereby at the same time a section is obtained for examination in the fresh state. Wherever the size of the object admits of such a division being made, one should not fail to avail himself of this opportunity, for the investigation of fresh material furnishes information on many points that could not be cleared up later on. This holds good more especially in regard to fatty metamorphosis and its distribution. Whenever, therefore, parts of larger bulk are extirpated, it is advisable to fix but a small portion, and to preserve the rest for fresh examination. There is nothing more unreasonable than to drop every piece of material without further ado in alcohol, or Müller's fluid, or in some other solution, and then to examine on some future occasion. In many cases a reliable histological diagnosis is thus rendered impossible. To resume : one small piece, while yet warm from the body, is placed in a concentrated solution of bichloride, the rest is put aside for examination while still fresh.

As regards the microscopical examination itself, in all small tumors the region of their transition into normal tissue must be brought into view. Sections must be, therefore, so made that the knife passes perpendicular to the base of the new growth, not parallel thereto. If the tumor is large it does not matter much which way you cut. You must be sure, in that case, to examine at least three regions of the tumor, taking sections from the base, from the centre, and from the periphery. At the base and the periphery the zone of main prolifera-

tion will be found,—that is to say, these are the youngest parts; the centre is the oldest.

Sometimes it is difficult to arrive at a correct diagnosis, even when every precaution has been taken to insure the success of your examination, unless you possess a considerable amount of experience. Thus much may be said in a general way: *sarcoma* is diagnosed mainly by the development of the cells as distinguished from the stroma and intercellular substance. The greater the number of cells, and the fewer signs they evince of any kind of particular differentiation, the surer is this diagnosis established. At the same time it is of importance, if you can prove the tumor to be growing down into other tissues, that it destroys and dissolves them. The same may be said of *carcinoma;* but here a new feature must be mentioned. My investigations on carcinoma cells have, I believe, led to a greater certainty of diagnosis. These cells should be compared with those of the tissue in which the growth originated. By being able to more exactly define their qualities, we are able, too, to diagnose with so much more assurance; hence the importance of examining both fresh material and sections that have been duly fixed and prepared.

It has been found, now, that the more difference there is between the cells of the new growth and those of the mother-tissue, the more firmly a diagnosis of carcinoma is established. Examination must embrace the shape, mutual position, and life-history of the cells. One must try to find out how a cell has been developed,—that is to say, one must study its karyokinetic figure; one must see how it looks in youth, how it behaves on getting older, and how, finally, it perishes.

Here, also, in conclusion, I should like to mention an example. You all know that proliferation among the cells of the epidermis takes place in the lowest layers. A certain kind of mitotic figure becomes visible during this process, characterizing them as epidermis-cells. You will find illustrations of this in my "Studien über die Specificität, den Altruismus, und die Anaplasie der Zellen" ("Studies on the Specific Nature, the Altruism, and the Anaplasia of Cells"). Out of these cells, that in youth are round, then become flattened by mutual pressure and finally cuboid in shape, the riff-cells of the rete Malpighii are formed. These finally perish by a process of cornification after having passed through a number of typical stages. When you come to examine any tumor of the epidermis, you should first of all look to the form of the cells. If you nowhere find riff-cells, if instead of cornification you find an irregular, hyaline, or fatty metamorphosis, if the layers are not typically arranged, but layers of dead cells, for in-

stance, are found right along-side of the belt of proliferation, then there is not much doubt as to its being carcinoma. If, then, you proceed to examine the karyokinetic figures and find them deviating to any considerable degree from the normal epidermoid type, or differing greatly from each other, many of them with the chromatine irregularly distributed, and fully if they are asymmetrical, then the diagnosis " carcinoma" is quite assured.

It would carry me too far if I were to describe to you the same process as it goes on in all of the tissues. You proceed in the same manner in all cases of tumor, whether of mucous membranes, or of the intestinal tract, or of the mammary gland, or wherever situated. All examinations of this sort, however, presuppose an exact knowledge of the normal tissues and of the life-history of their cells.
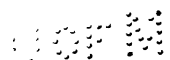
HIP-JOINT DISEASE.

BY JAMES E. MOORE, M.D.,

Professor of Orthopædic Surgery and Adjuvant Professor of Clinical Surgery in the University of Minnesota.

GENTLEMEN,—I bring before you to-day two cases of "hip-joint disease" for comparison. The one has been in the city and under my care for about one year and a half, and is now practically well, with a very satisfactory result. The other has been in the country and practically without treatment; and the result is that I am going to excise the joint to-day.

This boy was born in Sweden, and is now about eight years old. He has blue eyes, light hair, and a fair skin, and is altogether just such a child as you would expect to do badly with hip-joint disease or any other tubercular inflammation. Yet he has made a recovery far better than the average. When he first came to me he was crying all night with pain located mostly on the inner side of the knee. His thigh was flexed, adducted, and rotated inward. But I did not base my diagnosis upon this group of symptoms. They are the symptoms set down in the text-books on general surgery upon which to base a diagnosis, but there is a better means of diagnosis, and one upon which a positive opinion may be based at a much earlier period than would be possible were we to depend upon the deformity for information. One great secret of success in the treatment of these cases is *early* diagnosis, and the one symptom upon which orthopædists depend most is *limitation of motion*.

Whenever you are called to see a child who limps and complains of pain in the hip or knee, it is your duty to do as I did with this boy. I laid him flat upon his back, and found that when I forced the popliteal space of the affected side against the table his back arched, or, in other words, his popliteal space and lumbar spine could not both be made to touch the table at the same time. I found that the amount of

pressure necessary to roll the well leg upon the table was not sufficient to roll the painful one. I took hold of the well ankle, flexed the leg upon the thigh, and the thigh upon the body, and then moved the joint in every direction. I then took hold of the afflicted leg and attempted to go through the same movements, and found that it required more force to move this limb, and that there was a spasm or jerking of the muscles. These movements were all made very gently and without an anæsthetic. If such an examination was roughly made, the slight resistance offered by the muscles at an early date would be overlooked, and an anæsthetic would relax the muscles and obscure the symptoms. This limitation of motion in every direction, accompanied by spasm, is the most positive evidence of a beginning joint inflammation, and is due to the fact that nature always places the muscles on guard to protect the joint.

You see, as this lad lies upon the table, that the diseased limb is smaller than the well one. This is partly due to the disease and partly to the treatment. There is a little shortening, but not enough to interfere with the usefulness of the limb. The motion, as you see, is quite free in every direction. There is still limitation of motion as compared with the other limb, *but there is no spasm or pain.* This resistance is due to the changes that have been brought about in the joint structures by the disease. This is an exceptionally good result; I am sorry to say, one you are not safe in promising to parents. I have selected this case to demonstrate what may be accomplished in an unpromising case, and to suggest to you how to bring about like results in your practice. Some of you gentlemen will practise in the country where you cannot get elaborate appliances, but you can get everything this boy has had. His father is a poor man, and could not afford expensive apparatus, so I have employed the simplest and most inexpensive means possible to meet the indications. The prime indication in this or any other joint inflammation is to procure complete rest. By rest I mean that there shall be no motion in the joint, and that it shall bear no weight. The means that I have employed to meet the indications in this case are at the command of every physician, whether in the city or country. We have, as I shall demonstrate to you later, different varieties of apparatus for the treatment of this disease, but which, as clearly demonstrated by this case, are not absolutely necessary. They should always be used when the patient can afford them and when they can be readily procured. Almost every form of apparatus offered for sale in this country is made for carrying out the "American method" of treatment,—that is, the apparatus makes traction upon the affected limb, and at the same time allows the patient to walk without bearing any

weight upon the limb or using crutches.   In this case I applied a plaster cast from the knee of the afflicted side to the ribs; elevated the shoe on the well side three inches by means of a light wooden sole and had the patient use crutches.   This is the " English method" carried out in a ready American manner.   In England they rarely employ traction, claiming that fixation is sufficient.   The objections to this method are that the apparatus usually employed is very clumsy and the patient is obliged to use crutches.   It can, however, be carried out with very little expense and with good results.   In using this method be sure to apply the cast well up on the body, so as to fix the pelvis.

We have here a boy about the same age as the one you have just seen, who has marked deformity of the hip, and who is badly run down on account of his suffering, which has been very great.   He has been practically without treatment, and in all probability has not even had a correct diagnosis made.   I feel certain that every one of you can make a diagnosis in a similar case, and, if you cannot procure elaborate apparatus, can and will make use of the simple means employed in our other case, and thus save your patient much suffering and deformity. This boy began less than six months ago to suffer very severe pain, and has rapidly grown worse, and is now so bad that I am about to excise the joint.   You must not think that because you see an excision of the hip so early in the term you are likely to see many such operations, for I rarely find it necessary to excise the hip-joint.   There are very few cases that even without treatment would be as bad as this one in six months, and with proper treatment there are very few that get so bad as to require excision.   My reason for operating upon this case is that I believe that fracture of the neck or rather a separation of the epiphysis has taken place.   I get no crepitus because the joint is quite fixed; but when I draw Nélaton's line, that is a line from the tuberosity of the ischium to the anterior superior spine of the ilium, the trochanter is above it, where in the normal condition it is below.   This position is quite characteristic of dislocation, but a *dislocation in hip-disease very rarely occurs.*

A number of different incisions have been recommended in this operation.   I prefer for this case what is known as Langenbeck's incision, beginning at a point near the posterior superior spine of the ilium and extending down for about four inches over the trochanter, parallel with the long axis of the femur.   You see that our reasons for excising the joint in this case are good.   The whole joint is disorganized, and the head of the femur is entirely separated and acting as a foreign body. I now separate the muscular attachments from the trochanter, and

remove it with an osteotome. I find the acetabulum healthy, but find a sequestrum on the inner side of the femur, which I now remove, and find that the disease extends down into the medullary canal some distance, so that I deem it wise to make a counter opening well down on the outer side of the bone. Much time and ingenuity have been wasted in trying to preserve the periosteum in this operation. The best rule to follow is to remove diseased tissue, whatever it may be, as you see me doing with this Volkmann's spoon. I had hoped to be able to perform the ideal operation in this case, but, owing to the extension of disease into the shaft of the bone, I cannot do it. The ideal hip-joint excision is one in which we are able to remove the disease so thoroughly that we can close the wound without drainage and get union by first intention. I now close the upper end of the wound, pack the joint cavity with iodoform gauze, and apply the usual surgical dressing. The irrigation fluid you saw me use was a one to two-thousand bichloride of mercury solution. I use this solution because we are dealing with a tubercular trouble. I now place the limb parallel with the well one, which you see I can readily do, and apply a plaster cast from the toes to the ribs.

[NOTE.—Four weeks after the operation the wound is almost healed, with the limb in good position. The patient has been free from pain, and has gained flesh very rapidly.]

EPITHELIOMA OF THE LOWER LIP.

CLINICAL LECTURE DELIVERED IN THE CHARITY HOSPITAL.

BY EDMOND SOUCHON, M.D.,

Professor of Anatomy and Clinical Surgery, Tulane University, New Orleans, Louisiana.

GENTLEMEN,—There are, clinically, several forms and varieties of epithelioma of the lower lip, which it is of the utmost importance to recognize clearly in order to have a correct idea of the feasibility, easiness, or difficulty of the operation and of the prognosis. These forms vary according to the extent of the disease, to the limitation of the margin, to the condition of the lymphatic glands, to the laxity of the tissues, and to the general condition of the patient.

The case I bring before you this morning is that of an old man of nearly seventy, affected with an *indurated epithelioma* occupying almost all the lower lip, with some slight glandular enlargements. The case is rather an extreme one, and it will require the removal of all the lower lip, also of all the lymphatic glands. But the encouraging features about the case are that the ulcer is circumscribed,—*i.e.*, has a well-marked raised edge beyond which the tissues look and feel normal. The glands are not deeply affected and are not very large; an interesting peculiarity is that the digastric lymphatic glands are involved; they are not any larger than the tip of the little finger, but they are surely diseased and must be removed. It is not often that these glands, which receive the lymphatics from the middle only of the lower lip, are involved, even when the whole lip is affected. But for the knowledge of the anatomical fact of their existence they would have escaped detection, and would have been a centre of development and return of the disease several months later, thus rendering the operation useless as a curative operation.

The submaxillary glands which receive the lymphatics of the balance of the lower lip are much more involved and are readily detected; however, they are freely movable under the skin and upon the deep parts, and they do not promise any special difficulty in their removal. Next, the tissues at a distance are soft, elastic, and yielding,

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so that it is not anticipated that there will be much trouble in bringing the edges together after the removal of the offending parts. Finally, the man, although old, has a very fine constitution.

The patient has been well prepared for the operation, especially by being well shaved and by being kept for several hours on an empty stomach; this latter point is important, so as to lessen the chances of infection from vomiting. The urine has been examined, especially to make sure that there is no sugar.

The patient is thoroughly anæsthetized by the ordinary method, —i.e., Esmarch's mask and chloroform; but a few moments before beginning the operation, the anæsthetist employs the anæsthetizer of my invention, by means of which the anæsthesia is maintained without a mouth-piece and without interruption.

With a free field before us, we now proceed with the operation.

First, an assistant compresses the inferior labial arteries to reduce the hemorrhage to a minimum; then with a pair of long curved scissors the whole diseased parts are trimmed off; the squirting arteries are secured; a strong double silk suture is passed through the upper part of each flap and an attempt is made to approximate the parts; this manœuvre shows that the loss of substance is such as to require each flap to be detached from the bone and partly from the cervical fascia in order to bring the edges together without strain. This approximation is best effected with pins and silk, because they resist the contraction of the muscles better than any kind of suture, which cuts more easily under the involuntary movements of the patient. The mouth is very much puckered as a consequence of this suturing, but the tissues here yield remarkably, and when you see the patient again in a few weeks, and especially in a few months, you will hardly believe that it is the same patient who is now before you with a puckered mouth that will barely admit the tip of a large tablespoon.

Next we will proceed to the removal of the lymphatic glands. First we will remove the two small digastric glands, which is done without any difficulty; the wound is thoroughly washed and sutured. The submaxillary glands, affected on the *right side only*, are now to be removed. They are larger than a pigeon's egg, and are slightly adherent by the deep surface, but are finally dissected out without much trouble. A wound of the sublingual artery has caused a little hemorrhage, but this is soon controlled. As usual, the cavity is larger than the feeling of the enlarged glands would have led one to suppose; it is thoroughly dried and packed with iodoform gauze; the edges are partly stitched and strengthened with adhesive strips. The parts are

painted over with collodion and iodoform, and a proper bandage
applied over them. The patient will be fed with a spoon, or, better,
with a tube, until the parts have united. As soon as the bandage is
soiled, it will be removed ; the pins, sutures, and adhesive strips will
not be removed until they show signs of looseness, when they must be
removed, because they have done all the good they could do, and will
henceforth act as foreign bodies, irritating the parts. However, ad-
hesive strips will be applied so as to support the cicatrix until it is
strong enough.

The importance of this new apparatus in maintaining anæsthesia
uninterruptedly without a face-piece is incontestable, and is thoroughly

Souchon's anæsthetizer.

appreciated by all who have anything to do with face, mouth, nose,
or throat operations.

It is so constructed as to *force the vapor alone* of anæsthetics into
the pharynx, through a tube passed into the nose.   I call this new ap-
paratus by the newly-coined word " anæsthetizer," because such a device
requires really a new word to express its mode of action, which is
active, since the vapor is forced out of the receptacle into the patient
by an agency which is outside of the patient, who is himself passive ;
whereas inhalers are passive and require the exposure to the air of the
anæsthetic for their proper working, and require also the active co-
operation of the patient.

The point of special importance in the construction of the appa-
ratus is that both the inlet and the outlet tubes are high up above the
liquid, near the cork, so that no liquid anæsthetic can be forced into
the nasal tube except by gross negligence and inclination of the recep-
tacle.   However, to guard against any possibility of forcing the liquid

anæsthetic through the nasal tube, and also to guard against any spilling, so as to enable the anæsthesist to lay the bottle on the bed or table without any apprehensions as to the consequences, it may be well to fill the bottle loosely with sufficient absorbent cotton to imbibe and hold the anæsthetic ; a sponge or any absorbent material will do as well. This, however, *may* somewhat diminish the strength or quantity of the vapor at each pressure of the bulb.

Without such an efficient and simple apparatus it is next to impossible to make a *practical success* of maintaining anæsthesia in all operations in the face or its orifices, when otherwise the cone or wire mask has to be removed every few minutes to uncover the field of operation and enable the operator to proceed with the operation ; soon after the inhaler is removed the patient recovers from the effects of the anæsthesia, and the operator has to stop to allow the cone or mask to be applied over the face, and so on during the whole of the operation. With this anæsthetizer anæsthesia is maintained uninterruptedly.

It is a great saving of time, pain, bleeding, and shock to the patient, thereby contributing materially to the saving of life in operations which for the most part are long and bloody, and often bring the patient to death's door. It is also a great saving of mental strain to the surgeon, who can proceed uninterruptedly and rapidly with the operation.

The receptacle need only be filled one-third full of chloroform, or ether and chloroform ; the rubber tube is introduced through the nose into the *lower* pharynx (about two-fifths the length of the tube); by pressing the bulb more or less rapidly the amount of chloroform administered is graduated. Dr. A. L. Metz, demonstrator of Practical Chemistry in the Tulane Medical College, says that there are eight parts of air to one of chloroform forced out of the receptacle at each compression of the bulb.

The one who administers the anæsthetic can place himself in any position where he will be best out of the way of the operator.

In case of emergency any powder-blower with a bottle will answer. Care should be taken that the long stopper-tube should not dip down into the liquid anæsthetic, lest the liquid anæsthetic be thrown in, even upon moderate pressure of the bulb, unless absorbent cotton be used in the bottle. The ends of both tubes *should lie in the vapor only of the upper part of the bottle.*

Any atomizer will do also, provided the tube that dips down into the fluid be removed, otherwise the liquid anæsthetic will be driven through the outlet or nasal tube ; cotton may or may not be used in the bottle.

It is easy for any one to construct an apparatus *ad hoc* out of any bottle of suitable size. The two holes through the cork are quickly burned through with a red-hot piece of iron, or large wire, or a nail; any pieces of tubing, glass or metal, or two large goose-quills can answer; the bulb of a Davidson syringe or any other obtainable bulb may be adapted.

It requires but little of the anæsthetic to maintain the anæsthesia after the patient has been well anæsthetized by the ordinary method.

The second case of epithelioma, which you will next see, is one of a most discouraging type, characterized by the absence of a sharp or well-limited edge between it and the surrounding tissues, which leaves the surgeon always in doubt as to whether he has well removed all the diseased tissues beyond the microscopically infiltrated or infected parts; in this case also the glands are all swollen; but the ulcer and glands have had a much more rapid course than in the former case. It is questionable whether this form of epithelioma is really, *clinically*, an epithelioma; it is more of a carcinoma. This patient will be operated upon as a matter of conscience, because now and then some bad cases succeed against all our expectations and against our better judgment. I have laid all the facts before him, and he selects to take his chances, however small they may be, and we have no other alternative but to operate on him, which will be done after the same rules as the first case related.

There is a third type or form of the disease which results from the too long neglect of the dreaded enemy; the ulcer has become so extreme that it would be useless mutilation to remove it, or the glands are large, firmly adherent to all the surrounding parts, or have even ulcerated.

These cases had better be left alone.

However, we sometimes perform on them a palliative operation, which consists in removing with the knife or curette all the decaying surface of the disease which secretes the offensive ichor. In a number of cases this is quite a relief to the patient and to all those around. When you undertake such an operation be careful that you are not misunderstood by either the patient or his relatives and friends, that you simply promise relief, which itself may be only temporary.

In a general way you must remember that the following are the clinical forms and varieties of epithelioma that you will meet with and upon which depends success or failure.

1. A circumscribed ulcer with no glands perceptible on either side.

2. A large, circumscribed ulcer with manifestly enlarged glands on one or both sides.

3. A very large circumscribed ulcer and very much affected glands, but not firmly adherent to the surrounding parts. Such cases require dissection of the flaps in order to approximate them.

4. Same, with *inelastic* and *unyielding* adjacent tissues, requiring dissection of the flaps as far back, perhaps, as the angle of the jaw, and as low down as the thyroid cartilage, in order to be able to bring the edges together; the flaps must consist of the skin and platysma, and the line of dissection the layer of connective tissue between the platysma and the cervical fascia.

5. Very extensive circumscribed ulcer, the removal of which leaves a large gap which can only be partially closed, even after extensive dissection of the flaps. These cases require a secondary plastic operation, but only after the parts have thoroughly healed and are natural.

6. An ulcer with diffuse edges, more or less large, and with glands more or less involved.

This is bad, regardless of size and extent, not so much because of the almost impossibility of being sure of removing all the disease, but because of the peculiar clinical course of the affection.

7. Very extensive ulceration and glandular enlargement of whatever nature, rendering a palliative operation the only possible thing.

8. Patients with a scaly face skin, showing a disposition to develop the disease in some other location.

9. Patients with a bad general condition from age, bad habits, and bad constitution.

10. Cases where union has failed, leaving a more or less extensive gap, which requires a plastic operation; this operation should not be undertaken before the parts have assumed the appearance of normal tissues.

PHANTOM TUMOR; CÆSAREAN SECTION; TRAUMATIC GANGRENE OF LOWER EXTREMITY; MID-THIGH AMPUTATION UNDER COCAINIZATION.

BY THOMAS H. MANLEY, M.D.,

Visiting Surgeon to the Harlem Hospital; Consulting Surgeon to Fordham Hospital, etc., etc.

GENTLEMEN,—The young woman here on the table was sent into the hospital one week ago for the purpose of having an abdominal tumor removed by operation.

In many respects this case furnishes us with peculiar and unique features, and belongs to a class not commonly met with; therefore, unless one has had a practical acquaintance with similar cases, this condition may readily be mistaken for something else, and such a line of treatment instituted as will result in serious harm to the patient, and work incalculable damage to the surgeon's reputation.

FIG. 1.
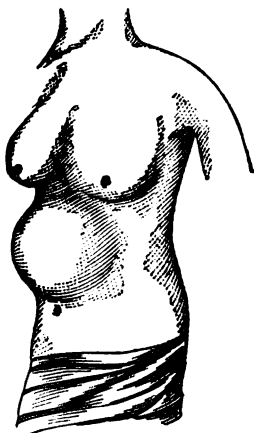
Phantom tumor of abdomen.

This patient comes into the hospital for the treatment of a tumor which is seated in the right hypochondriac region chiefly, though its internal free border extends far over to the left, across the median line (Fig. 1). Its lower outline touches the upper margin of the umbilicus, and then spreads over to the right side, into the lumbar region. It seems to rise up under the diaphragm, and is continuous with the liver. Such is the general outline, as seen in the diagram, which fairly illustrates its contour and situation, as we see it in situ.

Now, what is this formation, what its origin and its character, and what can be done in the way of treatment?

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In my own practice, my chief reliance is on the clinical history of the case, conjoined with careful examination over the seat of enlargement of the organs contiguous thereto, and the patient's general condition. On these we may safely depend, as a general rule, for definite knowledge; though it should not be forgotten that an accurate diagnosis of intra-abdominal growths is sometimes attended with great difficulties, and occasionally is quite impossible.

She is nineteen years old; fairly nourished; has had the ordinary diseases of childhood; menstruated first when sixteen years old; single; has had no specific disease. Never sustained any injury of the abdomen. Her parents are both living. One brother, ten years old, had several cervical glands removed in this hospital two years ago. This was promptly followed by multiple malignant lympho-sarcomata of the whole lymphatic system; the absorbents in the omentum undergoing enormous hypertrophy. Anæmia and marasmus cut him off within six months after the disease became generalized.

A little more than a twelvemonth since, she was in this service herself, for the removal of a growth which involved the cervical lymphatics. This, on dissection, was found to consist of a thick shell, with a broken-down suppurative centre. She has been well until three months ago, when she first noticed this fulness, which has since caused her considerable anxiety. Her general health is not seriously disturbed; her integument maintains a good color; she has lost no flesh.

Now, with this history, what may we expect to find? Perhaps at first thought we might suspect that she was afflicted with the same disease that had befallen her brother; that the absorbents of the omentum, the mesentery, or the liver were the seat of malignant, hypertrophic changes; for, because of the situation of the tumor, one can easily eliminate implication of the uterus and adnexa. But it is not the seat of pain; the pulse and temperature are normal, and she complains only when it is rudely manipulated.

We might eliminate the liver, because there are no disturbances with its functions; and the kidney is proven free, because by muscular relaxation and manipulation it can be located, and is found of normal size. We can eliminate aneurism and enlargement of the gall-bladder. The mass is almost spherical in form, and of a hard, unyielding consistence. It is rather movable. It is directly continuous with the liver, so that the free edge of the floating rib is indefinable on the right side, but on the left is easily outlined with the hand. There is nothing in the history to indicate an abscess-formation, though it gives, it was thought, a slight sense of fluctuation. On percussion, which was un-

satisfactorily carried out, owing to the hyperæsthesia of the abdominal walls, there was evidence of dulness, but not complete flatness. This was accounted for by the position of the transverse colon, which, it was assumed, traversed the growth over its anterior aspect. It was further assumed that if it had its origin in the retroperitoneal glands, it would crowd the intestinal coils up before it.

Having, then, made a careful examination into the case, freely purged the patient, and kept her under close observation for ten days, it was finally decided that the tumor probably consisted of hydatids of the liver, or else it was a retroperitoneal cyst.

There was one noteworthy feature in her case, which was rather puzzling, as an associate factor in an abdominal growth. She was markedly hysterical, having alternate laughing and crying fits on the same day, and there was nothing which seemed so promptly to calm her and subdue her nervous spells as the tincture of assafœtida.

She had come into the hospital, as she put it, to have the tumor "cut out," and she was impatient at our delay. As the case presented so many perplexing features and there was no indication for urgency,

Fig. 2.
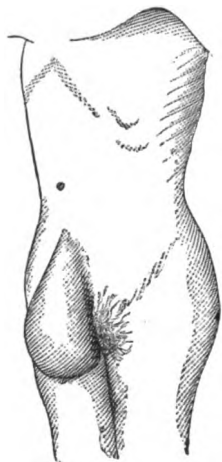
Ventral hernia following operation for phantom tumor.

it was only when she had been in fifteen days that it was finally decided to subject her to an abdominal section. Before doing so, however, it was thought advisable, in order to make a more thorough and radical examination, fully to anæsthetize her with ether. She took the anæsthetic in bed. When well under it, and she was lifted onto the examination table, not a trace of the tumor remained. It had vanished. It was a phantom. But it has returned; though, since she has been assured that no operation is to be performed, strange to say, it has diminished more than half in volume. To-morrow she will go home.

A few comments on this case and those of a kindred nature may not be amiss just here. First, as to those strange freaks of the muscles, occasionally seen in neurotic individuals, which give rise to these tumor-like masses in the abdomen. They are not common. But one such case ever came under my observation before. The patient was a young German, of twenty, who came to us determined to have an operation done. In her case the tumor was in the left hypogastrium, and the surface had all the characteristics of a genuine ovarian cyst.

But under the ether test it quickly faded out of sight. She left the hospital indignant because we would not operate. Two years after she came to the hospital with a genuine tumor. After she left us she went to a neighboring city, where she was accommodated. A laparotomy had been performed on her; an immense gash having been made from the pubic symphysis to the navel, through the scar of which there now protruded a large ventral hernia (Fig. 2).

In all cases of abdominal or pelvic enlargement, in which it is highly important to establish an accurate diagnosis, full etherization is generally necessary. The only exception would be when there are constitutional conditions present to preclude it, or in those who have thin, attenuated abdominal walls, and who can endure moderate manipulation without pain.

CÆSAREAN SECTION.

Since the young woman whose case, of imaginary tumor, we have been considering briefly was brought into the operating-room, a case has been sent here for immediate Cæsarean section. The history, as hastily prepared by the senior assistant and verified by the practitioners in attendance on the case, who are present, is as follows: Mary J., twenty-four years of age; married eleven months; of good physique, with no history of rickets and no organic disease during life; had good health until the latter part of the eighth month in pregnancy, when she noticed that her lower limbs had become greatly swollen; but, as she was assured by her neighbors that this was common in childbearing women, she gave the matter no attention until the latter part of the ninth month of pregnancy, when she commenced to have violent headaches, with very scanty, cloudy urine. She went on about the same way until, finally, labor set in at term.

Shortly after labor commenced, Dr. T. B. Murray arrived; but she was then in violent uræmic convulsions. On examination per vaginam he discovered that the os uteri was slowly dilating, and the waters were coming away; but the antero-posterior or conjugate diameters of the pelvis were so contracted that he could not pass three fingers sideways through: he estimated the diameter to be about three inches. Realizing quickly that he had a formidable, complicated case before him, Dr. John J. Crane was called in. It was now thought that, as she was young and her bones elastic, possibly the forceps might be introduced, and the head made to adapt itself to the deformed outlet. This was found impossible. Then turning was undertaken, but the hand could not pass the projecting sacral prominence. After a delay of some hours,

the patient's convulsions being kept under control by inhalations of chloroform, Dr. Douglas H. Stewart was called in consultation. The infant was dead, and it was first decided to try evisceration with the hook and crotchet; but the passage was so contracted and the head so high up that it was deemed inexpedient. On the urgent recommendation of Dr. Stewart, she was then sent into this service for immediate Cæsarean section.

Now, as to the general condition of our patient and her chances after delivery through a breach in the abdominal walls.

Let it be noted that she is at this moment in constant convulsions. Dr. O'Brian, the ambulance surgeon, tells us that he had to administer chloroform to her continuously all the way over to the hospital; and Dr. Murray informs us that the small quantity of urine which he withdrew to-day contained ninety per cent. of albumen.

You notice that she has the blowing respiration of uræmic coma. Her pupils are widely dilated; the skin is cool and of a deathly pallor. The pulse-beat is 130 to the minute, and is both thready and tremulous. No fœtal heart-sounds are perceptible.

Dr. John G. Truax, of the hospital visiting staff, has made a careful vaginal examination, and advises a Cæsarean section in preference to a symphyseotomy.

But what are our patient's chances under any operation? for it is well to observe here that she is probably suffering from a fatal form of renal disease, and there is nearly complete suppression of the urine. If the child were alive, we might answer that, at all events, it could be saved. The operation, then, is undertaken only as a last and extreme resort,—not because there are any additional dangers, or that it is a difficult procedure, but because it will probably not be followed by the recovery of the mother.

Now, a few words on the operation while the patient is being prepared and everything is gotten in readiness.

The Cæsarean operation is of great antiquity. In past centuries competent surgeons unhesitatingly performed it, and often with success. Then it was undertaken promiscuously by timid, unskilled amateurs, with the result that they lost most of their patients. With the rapid advances in surgery of late years it has been revived on a large scale, and with almost universal success when undertaken at the right time. American surgeons, notably Senn, of Chicago, and Bernays, of St. Louis, have recently reported their experience with it. This operation, though apparently a formidable one, is not as much so as it appears. On the contrary, of all the capital operations in surgery, this

is one of the most simple. By the observance of rigid asepsis, with proper preparation, and two assistants, the delivery of the infant is but the work of a few moments. The great dangers are from hemorrhage and septic infection. With ordinary precautions these are readily avoided.

As in all operations attended with an extensive section of the tissues and the opening of two cavities, more or less shock must necessarily follow. Unfortunately, this is often terribly augmented by the patient's state when she is turned over to the surgeon for operation. Her vital powers are then at a low ebb, and it only needs but a slight additional shock to remove her last chance. But woman is endowed with marvellous resisting and recuperative powers to bear and survive childbirth, and hence it is that so many outlive the terrible ordeals which occasionally attend parturition, and frequently triumph over dangers of the greatest magnitude.

Everything is now ready. The operation will be begun by making an incision which will extend from the summit of the uterus, just below the umbilicus, to the symphysis pubis. This incision should split the skin over the white-line from end to end. The next incision should penetrate the aponeurosis and peritoneum. Now the uterus is raised and rolled out through the incision, after the omentum and intestines are pressed aside. Next, a pair of knitting-needles are passed through the cervix, just below the upper insertion of the broad ligaments, when a piece of rubber tubing is carried around to shut off the uterine vessels, and is secured. The uterus is then opened directly over the centre, and the fœtus with the placenta is delivered. The uterus having contracted down to a small size, the original incision through its walls is diminished more than three-fourths. Some operators close in this breach with two or more rows of sutures. In this case I will first pass in six or eight deep interrupted sutures down to, but not including, the deciduous membrane. Then a row of continued sutures of the same depth will be carried through the muscular wall, when the deep tension sutures are firmly tied; and, lastly, a row of fine silk sutures run closely together will close in the peritoneal investment. The constrictor is now removed. There is no leakage. The uterus is returned, the omentum drawn down, and the abdominal incision closed with tampon drainage of gauze-wick, passed in deeply at the lower end of the incision. A piece of rubber tubing is now passed up into the uterine cavity, and drainage will be secured, by way of the vagina, through the dilated os.

The ordinary dressing will be applied, and the patient placed between warm blankets and returned to bed. It will be observed that,

although the ether has been discontinued some time, all stertor has ceased, the clonic spasm and muscular tremor which pervaded the whole body have passed away, and she now rests in an undisturbed quiet sleep.

Her pulse is reduced in frequency, being now but 110 to the minute, steady and regular.

You have seen, then, that the performance of this operation is not at all difficult; that effective hæmostasis, provision against further loss of blood, and protection against infection, have been rendered simple and easy of accomplishment.

As to prognosis: it seems to me that the whole future of this woman depends on the action of the kidneys. If these organs are not irreparably damaged and can be stimulated into action, her chances are very good; but, on the other hand, should suppression persist, then she certainly is doomed, and her end is not far off.

TRAUMATIC GANGRENE OF THE LOWER EXTREMITY; MID-THIGH AMPUTATION UNDER COCAINIZATION.

Our next case, and the last, is one of traumatic gangrene of the left leg, succeeding simple fracture of the lower third of the femoral

FIG. 8.
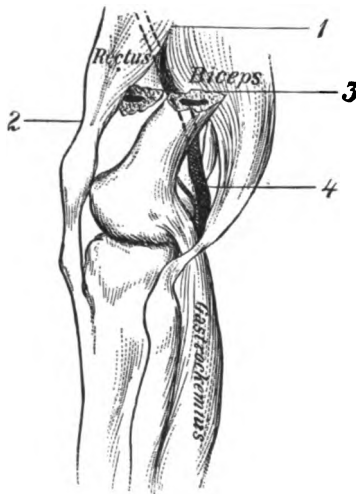
1, Upper fragment of fractured femur; 2, quadriceps extensor tendon enclosing the patella; 3, upper end of lower fragment in contact with femoral artery; 4, femoral artery occluded at the site of the fracture just before its entrance into the popliteal space to become the popliteal.

shaft. Our patient is a man, sixty-four years old, who was injured just sixteen days ago by being knocked down by a pair of horses,

after which he was run over by two wheels of a truck loaded with bricks.

At the time when brought in by the ambulance, so great was the shock of the whole system that the house surgeon, Dr. John T. Cahill, attempted nothing with the crushed limb beyond placing it comfortably on pillows, but gave all his attention to the man's general condition. Everything was done to bring about reaction; but it was not until after forty-eight hours that the heart regained its former strength, and he showed signs of having fully recuperated.

Below the point of fracture it was then apparent that the vitality of the limb was jeopardized. The surface was cold, no pulsation could

FIG. 4.   FIG. 5.
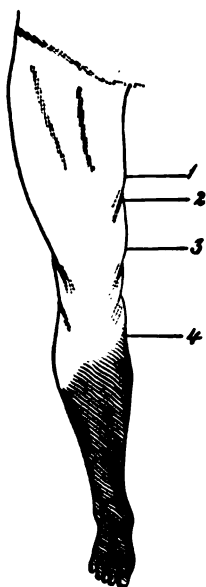
1, Line at which saw entered; proximal fragment; 2, line of fracture through femoral shaft; 3, line of circular incision through integument and muscles; 4, line of demarcation anteriorly.
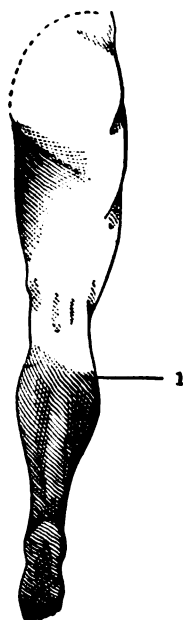
Posterior aspect. 1, Oblique line of demarcation projecting slightly higher than on the anterior aspect.

be felt in the tibial vessels where they lie superficially over the instep and inner side of the ankle. The integument was of a pale, bluish, mottled color, and at the base of the nails commenced to corrugate in fine, curvilinear wrinkles. Sensation from three inches below the tibial tubercle was entirely lost. The whole limb from below the seat of fracture to this point was intensely painful.

He was now acquainted with the condition of his leg, and advised to submit to amputation at an early date. This he positively refused. The limb was then placed alternately in the inclined plane and an extension apparatus; but the parts above and below the knee were so exquisitely sensitive that neither could be endured. The position best supported was with pillows under the knee, the thigh fixed laterally by supports, and the leg hanging free, though enveloped from the toes up with antiseptic dressings.

As time progressed the indications of aseptic mortification, or dry gangrene, became more marked. The tissues of the foot commenced to part with their aqueous elements; the toes became hard and dry like those of a cadaver. The integument of the leg began to bronze and blacken as the changes attendant on decomposition advanced towards the body.

On the seventh day the line of demarcation became well marked. As these pathological changes became accentuated and spread, our patient's sufferings were so intensified that neither rest nor sleep was possible without the free use of opiates.

It may be well to consider for a moment the causes which have led to the loss of this man's limb, and the means we will adopt to secure its painless severance from the body.

A predisposing cause in this case is, no doubt, age. He has reached that stage in life when degenerative changes commence in the walls of the arteries. He says that he has worked hard and drank alcoholics all his life.

The immediate or determining cause was fracture, with an injury of the femoral artery, resulting in the formation of a thrombus and complete obliteration of its lumen. We find that the shaft was shattered at about the point where the artery pierces the tendinous insertion of the adductor magnus, and passes immediately under the triangular end of the femur. Here it was crushed by a weight from above and the hard, resisting pavement from below. A truck containing a thousand bricks passed over the limb. Gangrene of a limb succeeding fracture is not often seen, though when it does occur it often involves the surgeon in serious trouble, and he may be blamed for its advent. In this case, had the house surgeon blindly followed the common custom, and immediately placed the limb in splints or plaster of Paris, the chances are that he would get the credit of having destroyed the limb by tight bandaging or maladroit adjustment in its fixation. It is my impression now, after having seen and treated more than two thousand fractures, that gangrene seldom occurs after splinting is applied to a frac-

tured limb, unless in those cases wherein the vessel suffered damage at the time the bone was injured.   The fatal error is made in the indiscriminate immediate application of splinting after all fractures, as is the modern vicious custom, rather than comfortably adjusting the fracture and waiting until the circulation is fully re-established before any description of rigid adjustment is placed on the crippled limb.

The type of gangrene which we have before us is what is technically known as dry gangrene,—a variety totally unlike hospital or moist gangrene.   It is an aseptic decomposition of the tissues, which is chiefly local in its action.   At the line of demarcation the blood-vessels and lymph-channels are so occluded by thrombi or retraction of their ends that the entrance of toxic elements into the circulation is guarded against.

Our patient has held out against amputation until this late date, because, as he says, he is afraid that if he takes ether he will never survive operation ; and without it, or some other anæsthetic agent, in the present inflamed, irritable state of the tissues, it would be impossible for him to endure the pain of an amputation.   Already his general strength is greatly reduced, so that in amputating it will be important that we obviate shock as far as possible.

It will be seen in this gangrenous limb that the line of demarcation extends down farther on the anterior and outer aspect than posteriorly. In fact, behind the discoloration of the integument passes closely up into the popliteal space.   It is therefore evident that enough of healthy integument cannot be provided to secure covering from the upper segment of the leg.

This is unfortunate, for the reason that with the knee-joint preserved the utility of the limb is vastly enhanced ; and besides, with our patient's general condition so low, the dangers attendant on amputation are always greatly augmented the farther up the thigh we divide the tissues.   If a similar case in a healthy growing child should come under my care, I would, however, hazard an amputation below the knee-joint.   But in this case, with the feeble vitality in the tissues and scarcely enough sound skin to cover the broad osseous surface which a section would leave so near the joint, the chances are that consecutive gangrene would follow, and thereby cut off our patient's only hope of recovery. Moreover, as a general rule, in amputations necessitated by gangrene following fracture, it is a pretty well-established principle to always sever the limb through the site of bone-disorganization, or a little above it.

This leads us to the next question in connection with amputations of the extremities,—viz., the flap.

How shall the flap be formed, and of what shall it consist? If one were to decide this question from the information derived from the average text-book on surgery, nothing would seem easier. But those directions are of little or no aid when put to a practical test in traumatisms.

In these cases, when the surgeon aims at preserving every particle of vitalized tissue, and wishes to avoid a secondary amputation, his principal guides must be experience, the general condition of the patient, and the local state. Then let us, under these circumstances, entirely disregard this one's and that one's flap, the short or the long, the circular or the oval, and endeavor to preserve an ample covering for the stump without cutting too close, or, on the contrary, leaving such a redundancy as will break down and slough. This is sometimes exceedingly difficult to determine, for the reason that none can foretell how the flaps will behave. The main thing which we should look to is, that the flap is amply nourished by a free circulation; and the older our patient is, the more care and discrimination must be exercised in this direction.

The consistence of the flap, therefore, as well as its situation and outline, must be regulated largely by the age of our patient and the local state of the circulation. Thus, in the young and healthy subject we may make a flap of the skin alone, including certainly the superficial and deep fascias, and endeavor to secure prompt union along the line of approximation. But with those advanced in years, probably suffering from atheromatous changes of the arteries, after amputation for gangrene or other pathological conditions, integumental flaps are very prone to slough, though in occasional cases they may escape.

For this reason, the flap which best preserves its vitality, favors primary union, and provides the best stump, in the senile, is the circular or muscular.

That is the kind which we will endeavor to employ here. The muscles carry the blood to and from the flap. In this manner its vitality is preserved, and an ultimate sloughing is averted.

In this limb, which we are about to amputate, the knife will enter through the integuments in a circular line, just above the summit of the anterior synovial pouch, or about three inches above the upper margin of the patella. The knife's cutting edge will be at once pressed down to the bone, and then with one quick, continuous, circular sweep

carried around the limb; then, without anything more than a very moderate retraction of the muscular fibres, the saw will be sent through the shaft. This will be but a little more than two inches below the point of fracture. Two lateral incisions will be made into the loose free end of the flap, when the fragment will be removed, and the sharp, spiculated, proximal end will be stripped and sawn off. This ought to permit of an easy falling together of the flaps, and the formation of a stump which will be serviceable.

We propose in this case to employ cocaine locally as a substitute for ether anæsthesia. This practice is something in the way of a new departure in major amputations. But the case is an ideal one on which to test it. His urine is slightly saccharine, and this condition is almost invariably aggravated by ether. His heart-action is so feeble that we scarcely feel warranted in administering chloroform. An amputation under cocaine enables us, by the aid of the elastic bandage, so to localize and concentrate the action of the drug that full analgesia is secured without danger of systemic toxic action supervening, as the saturated tissues are flushed out by the escaping blood after the vessels are divided. As cocaine anæsthesia endures for twenty or thirty minutes, ample time is permitted to complete an amputation and close in the stump before sensation returns. With the elastic constrictor in place, the period of analgesia may be very considerably protracted, as was pointed out by Corning, who first called attention to it. Our patient has had six ounces of whiskey in divided doses of two ounces.

Now, with the elastic bandage on, we commence the hypodermic injection of cocaine,—a four-per-cent. solution,—and we inject it deeply in several places through the whole circumference of the limb in the lower third of the thigh. We have used one hundred and eighty drops, or the equivalent of seven grains of cocaine. We employ this heavy dosage here, first, because of the deep structures which we must divide; secondly, because the Esmarch bandage effectually prevents the alkaloid entering the general circulation; and, thirdly, because when the parts are divided down to the shaft there will be a free outpouring of blood, which will wash away the greater part of the liquid injected. We are now ready to amputate, and, having everything in readiness, will do it with all possible haste.

The amputation, as you have seen, and as the patient has told us, has been perfectly painless. He says that he feels the sutures being introduced, but has no pain whatever.

The operation completed and the dressings applied, we find that our man's general condition is very good. His pulse is 112, and regular.

The steady grinding pain which he complained of is gone, and he says he is very comfortable.

Indeed, there seems no reason now why he should not make a good recovery, though his advanced age and the pathological character of the state for which he has been treated lend uncertainty to the prognosis.

[NOTE.—The young woman on whom Cæsarean section was performed passed a most comfortable night, and her general condition was very hopeful till noon of the following day, though suppression of the urine was nearly complete. At this time violent and uncontrollable vomiting set it, and she sank at 10.30 P.M.,—dying about twenty-seven hours after the operation.

The amputation case—now two weeks since it was performed—is doing well. Since then we have performed a partial amputation or resection of the right forearm upon another patient for a bad railroad smash, employing cocaine injections, as in the preceding case, with every satisfaction.]

Genito-Urinary and Venereal Diseases.

SOME UNUSUAL FORMS AND PHASES OF SYPHILIS.

CLINICAL LECTURE DELIVERED AT THE CITY HOSPITAL, NEW YORK CITY.

BY CHARLES W. ALLEN, M.D.,

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Randall's Island Hospitals.

GENTLEMEN,—I have already dwelt upon the commoner forms of
the primary lesion of syphilis, and you have been shown numerous ex-
amples of the dry scaling papule, the superficial, excoriated patch, and
the ulcerating Hunterian chancre. You have also seen some beautiful
examples of roseola, small and large papular syphilide, as well as the
grouped miliary, papular, squamous, tubercular, and gummous forms.

It is most important that in the study of so broad a subject as
syphilis you should not become narrow, and therefore I wish to im-
press upon you to-day such facts as will enable you to think out for
yourselves the true meaning of those appearances which deviate from
the type, and encourage you not to be bound down too closely by rules
in regard to a disease which knows no rule, nor to look for constant
features in the manifestations of this great pathological simulator. As
these two young girls stand before you the only thing noticeable about
them is that the upper lip in one and the lower lip in the other is
swollen, projecting, and the seat of some kind of a sore, while in the
first there is such an enlargement of the glands beneath the jaw upon
the right side that the throat appears considerably enlarged. As I
touch this swelling I find it firm and of almost cartilaginous hardness,
though scarcely at all sensitive. In the other case there is no swelling
in front, though the glands at the back of the neck are enlarged. As
I press the stiff upper lip of the first patient between my fingers a
decided resistance is offered, and the central portion, where the rounded
lesion is located, is made to stand out more prominently. The patient
tells us that a sore was located here ten days ago which healed of itself.
As we evert the lower lip of the second girl an extensive ulcerating
patch is seen extending to the labio-gingival fold, and occupying one

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lateral half of the inside of the lip. There is no induration about the surrounding swelling, and the patient tells us her mouth has been sore more or less for six months, and that she had an eruption eight months ago. In the first case we have *primary syphilis of the lip*, and in this one its secondary manifestation. Now let me say a word about extra-genital chancres. Much has been written of late about syphilis in the innocent, and it is all very well to attribute a lip lesion to some acci-dental cause, but do not be so innocent yourselves as to suppose that to be of venereal origin a chancre must occupy the genital region. I have recently treated four patients in my office whose primary lesion was in each instance upon the lip, and I convinced myself that each was vene-real in the sense that it was acquired from a woman with whom the patient had no moral right to be holding intercourse. Two of these patients got it from the same woman, and I learned from them of a third instance from the same source, but number three did not come under my personal observation. I do not mean to deny that there is much accidental infection, for I am aware that there is far too much, and I am continually seeing instances,—often sad ones,—but I do believe that many would-be innocent sufferers could cry out in the words of the Psalmist, "Before I was afflicted I went astray," if they would only cry out truthfully.

Now, this girl is truthful, if she is not as wholly innocent as she looks. She tells us that she has not menstruated for about three months, and examination shows that the patient is pregnant. We asked her, in taking her history, if she was married, and she told us she was not. We have therefore no need of questioning in regard to possible contact with infected utensils, dentists' instruments, etc.; nor is it necessary to ask her if she has kissed any child with a sore mouth. The girl has had a lover, the lover has had a mucous patch, a kiss at the time of procreation, or at some other time, has transferred the virus.

Now as these two girls let their dresses fall to the waist, this one is seen to have a clear skin, with the exception of the sides and back of the neck, which are seen to be pigmented in a peculiar mottled man-ner. She tells us that this condition has come on recently, and she is positive it was not present before the lip became sore, some six weeks ago.

This, gentlemen, is an instance of the somewhat rare *early pigmentary syphilide*, a condition formerly overlooked in many cases, and one not even now accepted by all as a primary condition, some believing that a superficial eruption always precedes it, the pigmentation taking place about lesions which have been perhaps abortive. I cannot share the

latter view for all cases, as I have repeatedly seen instances like the one I now show you, where, in the absence of other skin manifestations and in the absence of a history of eruption, this peculiar pigmentation has occurred sometimes quite early, as in the present instance, the primary lesion being still present.   Though much more frequent in women, I have had repeated opportunities to point it out to the gentlemen of the house staff in male syphilitics.   You notice the woman is a decided brunette, and it is in these dark subjects that the most pronounced instances are encountered.   This is the *retiform* variety, and you observe how the appearance of the lateral surfaces of the neck suggests a severe tanning through the open spaces in a lace kerchief.

At first glance leucoderma or vitiligo is simulated, but attentive inspection shows that, while the light areas appear whiter than the skin at a distance, it is only because of the contrast with the hyperpigmented margins.   Histological observation has demonstrated an abnormal amount of pigment in the seemingly white spots.   According to recent investigations, the occurrence of this condition is due to an inflammation of the smaller vessels of the skin, and is probably one phase of the general derangement of nutrition found in this stage of syphilis.   Irregular patches of chloasma are, as you are aware, often present about the mouth and other portions of the face in early syphilis, and more especially in the hereditary form.   These of which I now speak are primary manifestations, and, it seems to me, lend support to the claim that pigmentary syphilide of the neck does not have to depend upon preceding erythema.   They may be explained by disordered circulation, loss of pigment by the red blood-globules, which becomes localized in the Malpighian and possibly other layers of the skin.   Under the inunction treatment, which this girl is now started upon, the pigmentation will gradually fade without any local applications, though it may be months before all traces will be lost.

In the second case we likewise interrogate the surface of the body for confirmatory evidence in support of our suspicions regarding the mouth lesions, and how richly is our questioning rewarded.   Here you see the whole trunk covered with a most pronounced annular and serpiginous *papulo-squamous syphilide.*

It resembles so closely a psoriasis in its configuration and the glistening of its scales that we naturally hesitate.   Upon close inspection we note that the skin area, which is embraced by the broken rings as they extend at the periphery, is fawn-colored, indicating a mild degree of pigmentation in the parts from which the active lesions have disappeared.   Now, while this is a possible result in psoriasis, it is

very rarely seen. Again, there is evidence of decided involution going on in many of the wavy outlines of the eruption, and this has occurred under the influence of mercury rubbed into the skin as much as possible away from the lesions. Furthermore, we have the girl's statement that until eight months ago she never had any eruption, and the one she had then was not scaly. The present outbreak dates back four months. This, gentlemen, is not the usual story of psoriasis in young adults, but it is a very good account of the way syphilis sometimes acts.

Remember, then, that a squamous syphilide may look almost exactly like a psoriasis, but do not call it by the confusing name syphilitic psoriasis. The possibility of a subject of true psoriasis acquiring syphilis must also be kept in mind. In the case before you a rather typical adenopathy confirms the diagnosis.

The next patient furnishes a beautiful example of *double chancre*, not the double chancre *à distance*, as in cases now and then seen, where one lesion is on the penis and another on the lip or other region of the body, appearing synchronously, but two typical primary indurations upon contiguous surfaces.

As this young woman lies upon the table with the thighs well drawn apart, you observe two distinct round patches occupying the lowermost part and internal surface of the greater lips, exact counterparts of each other in size, shape, and location. They stand like two sentinels guarding the entrance, and fortunate the intruder who could pass them with impunity. I say "could" in its past sense, for they are not so dangerous now as they were up to a week ago. When this patient entered the hospital these were open sores, and because of their multiplicity, and at that time lack of induration, and especially as it seemed evident that the one had arisen by inoculation from the other, they were diagnosticated chancroids by the house surgeon and cauterized. So you see how easily one may err upon either side of this question. At the present time no doubt is present. The lesions are as firm and button-like as one might wish to see, even upon the male genitals. There is an enlargement of the glands, most marked in the groin, and here upon the chin you will perceive two rings, or rather one ring and a broken circle, resembling ringworm, but less distinct, less inflammatory, less scaly, and with a dirtier, more pigmented appearance. Now, this is all there is of an eruption; but it is enough to confirm our opinion, if evidence were necessary, and to show that the induration in these labial lumps is not due to the burning the sores received. Chancres of the great lips are not always so chancre-like, if

I may use the expression, but the ulcer or superficial erosion usually rests upon a base somewhat raised above the surface, and the whole labium or at least the half implicated is in a state of diffuse induration, which may cause the affected side to appear possibly several times as large as the other, and occupy a much greater time in disappearing than the circumscribed lesion itself does.

The soft chancre or chancroid, as it is commonly called, is, as you know, frequently multiple, sometimes because its virus is auto-inoculable and sometimes because preceding conditions, such as balano-posthitis, herpes progenitalis, excoriations, injuries *in coitu*, etc., have prepared· many ports of entry. Now, whenever any of the second series of conditions obtain, we may have multiple· hard chancres. The syphilitic chancre cannot reproduce itself upon the same individual. At least this is the rule, and it is generally accepted as infallible. However, certain cases have been observed where inoculation has occurred in remote portions of the body, at short intervals from the exposure producing the first. Hence a certain time must elapse before a given inoculation becomes operative, as a protection to the system against subsequent infection. If now, during this interval, of whatever length it may be, any virus is so located at the point of original inoculation that it can be transferred to an abraded surface, a second chancre will result, and it will be to all intents and purposes an inoculation from the first, and still at this early period there is nothing present which can be termed a chancre. If syphilitic inoculation produced an ulcerated surface as quickly as is the case with chancroid, auto-inoculation might be a possibility, but by the end of the fortnight or month, when the induration has occurred which we call chancre, the system is already so permeated with syphilitic poison that it is incapable of being injuriously influenced by a second application of the virus.

I have to-day an opportunity to show you a rather exceptional variety of chancre, and one which is often omitted in text-book descriptions,—*the crusted or ecthymatous chancre.*

This form usually shows evidence of a crust or scab only about the edges of the sore, but in this case, as you see (Fig. 1), a thick, adherent, dark-colored crust covers the entire ulcer, which is situated upon a slightly-indurated base occupying the skin surface of the dorsum, just behind the corona, which, together with the whole glans, is hidden by an elongated prepuce. You may ask, How do we know the lesion is a chancre? First of all, the base has a characteristic hardness about it, which, however, is not so marked as in many cases, but too pronounced to be accounted for by inflammation. Secondly, the glands in both

groins are enlarged but not sensitive. Thirdly, there is a history of exposure about six weeks before the appearance of a small firm papule which gradually enlarged, became hard at the margins, while the central part suppurated, the secretion gradually drying into the crust you now see. Another point in our favor is that a sore upon the skin surface is much more likely to be a primary lesion than a soft sore. You will

FIG. 1.

Ecthymatous chancre.

note in passing that upon the inner surface of the right thigh there is a distinct ring marking the outer border of a patch of eczema margin-atum extending into the crotch.

Now, while there is no question in my own mind that this is an initial sore of syphilis, we will not begin treatment at once, which is my practice as soon as I am positive of my diagnosis, but will wait for an eruption to show itself, and in the mean time we will have an opportunity to secure a photograph, for the case is worth preserving.

WHEN TO BEGIN TREATING SYPHILIS.

The rule so much insisted upon and so continually drummed into students' ears that mercury must not be commenced until the second-aries appear is capable of producing much harm if too closely fol-lowed. I suspect that many teachers so instruct their pupils, knowing how little opportunity a man has while in college to perfect himself in this branch, and believing the patient's chances of being treated for

syphilis when he doesn't have it would be greater than his chances of suffering from delay.   That early treatment postpones and masks the subsequent manifestations I know, but that it often prevents entirely all secondary signs I do not believe.   Hence the objection that if you begin mercury early you are always in doubt as to the diagnosis falls to the ground.   I never yet saw an instance in which the mucous patch or some other symptom failed to appear.   The belief of many able men that treatment during the chancre-stage makes the development of cerebral syphilis more likely I cannot share.   Personally I have had no such experience, and practically I can see no reason why this should be the case.

I do see, however, how such a rule can work decided harm.   Take, for example, the case you first saw, of chancre of the lip in a pregnant woman.   The man who could not make a proper diagnosis of the lip lesion surely would not recognize the pigmentary syphilide of the neck, and by the time any generalized eruption with which he was familiar had made its appearance it would be too late to prevent an abortion. Delay would here have sacrificed a life.   And even without taking into consideration the welfare of the offspring, is it wise to leave untreated such a contagious lesion, so dangerously situated, for all with whom the patient may come in contact?   And still, if you are convinced that cerebral syphilis will follow early treatment, or even that precocious manifestations and severe recurrences will result, the danger to others must not influence you, for your first care is to do the best for your patient's good.

The next case I have to show you illustrates the precociousness of the first eruption, which may be severe, without the element of too early mercurial treatment being to blame for it.

Before we look at him, however, I want to finish what I have to say about unusual chancres.   As you know, the superficial erosion, often healing over quickly, and the ulcerating, scooped-out sore, commonly called Hunterian chancre, are the varieties we most frequently encounter.   Besides these there is the dry, scaly papule or patch ; the papillomatous lesion, with dry or moist surface, according to its location ; the slowly-extending gumma-like chancre, which may heal upon one side as it slowly advances in the opposite direction (probably due to some mixed infection); the fever-sore-like, slightly thickened, excoriated patch usually seen upon the lip ; the false-membrane-covered sore in the same location, the combination of chancre and chancroid, and the phagedenic ulcer.   In most of these uncommon forms treatment may well be delayed until enough signs follow to make the diag-

nosis sure. Usually the subsequent course of the disease cannot be predicted from the form, size, or situation of the chancre. But in the case you are about to see one could have foretold the severe secondaries which followed, if it had been surmised that the phagedena present from the date of admission had taken place in a specific sore, and was not, as at first supposed, a chancroidal process.

As this man strips and steps before you (Fig. 2) you see a well-built, robust-looking individual, whose body is covered with round ulcers from the size of a split pea to that of a copper cent, one being even larger, interspersed with pustular lesions, some of which have a central depression suggestive of variola or varicella. This man is thirty-two years of age, weighs two hundred and thirty pounds, and has always been well until two weeks before coming under our observation, when, on account of a sore, he had applied at the New York Hospital, and had been treated there for two weeks. The last connection, he says, was two weeks before the penis began to trouble him, and previous to that he had not been exposed for two months. Local treatment alone had been employed, such as would lead us to suppose that syphilis was no more suspected by those through whose hands he had passed than by ourselves. There was a tight phimosis, with much inflammation and œdema of the whole organ. Upon splitting up the dorsum of the foreskin an extensive phagedenic ulceration was disclosed, involving the whole inner surface of the prepuce. This extended rapidly in spite of thorough cauterization and antiseptics, and within a few days had laid bare the corpora cavernosa, and continued its denuding march up the sides of the organ. The skin of the penis was undermined almost to the pubis. All this time there was no more induration present than one would expect from an inflammatory cause. Finally, upon the twenty-seventh day after admission, and while the ulceration was still very extensive, an eruption occurred upon the face, gradually extended over the trunk, and, last of all, appeared upon the extremities only after about three days.

This eruption was at first papular, many of the papules appearing like shot-grains beneath the skin gradually coming to the surface. Within a day or two they became pustular and some of them umbilicated. These lesions came out in crops, and, as I have said, gradually invaded the surface from above downward. There was headache, backache, fever of 102° F., malaise, and severe sore throat. You will not be surprised after this account to hear that small-pox was at first suspected. Naturally syphilis came in now for the first time for so large a share of suspicion that the diagnosis quickly turned in its favor.
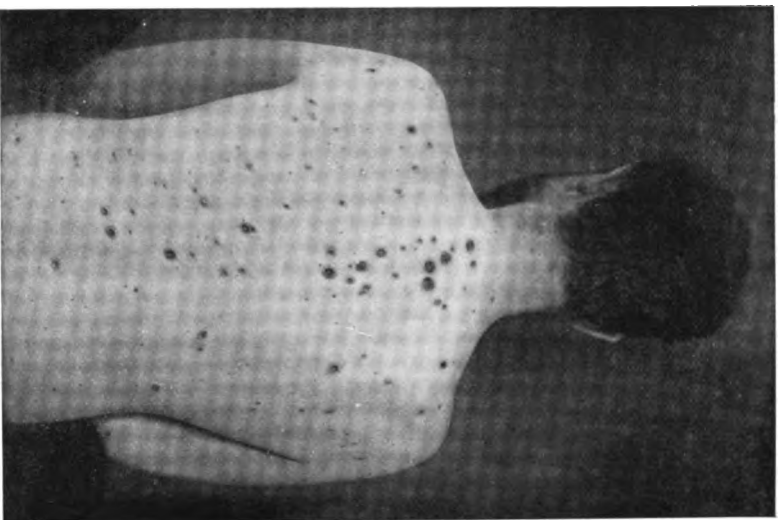
Fig. 2.—Diffuse syphilitic ulceration.
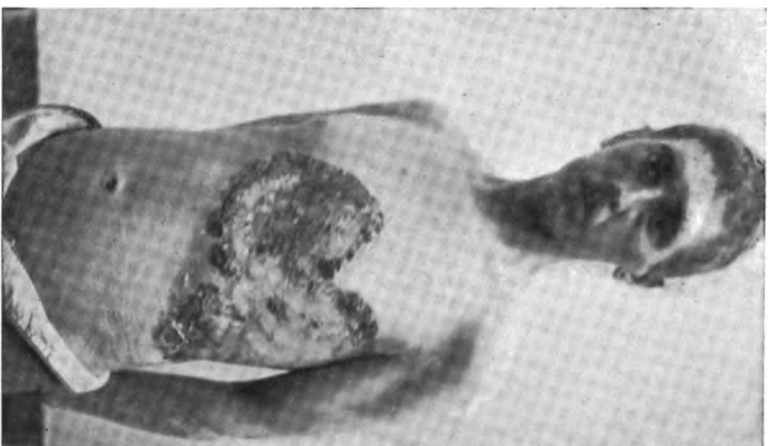
Fig. 3.—An ulcerative serpiginous syphilide.

Within a few days many of these spots began to ulcerate and to take on the appearances you now see. Mercurial inunctions were begun some days ago, and the beneficial effects upon the ulcer of the penis are already very noticeable, and granulations are filling in rapidly to replace the lost tissues. Such, then, is the history of this rather noteworthy case,—a pustulo-ulcerating syphilide as the earliest eruption, at one stage so like variola that even a board of health inspector was in doubt, the primary lesion being a phagedenic ulcer resembling chancroid much more than chancre, and not tending to heal until mercury was begun. This would then be one of the exceptional cases in which a rather severe subsequent course could be anticipated, and still I feel justified in saying to this man that if he takes good care of himself, does not drink, and faithfully follows out treatment for three or four years, his chances are about as good as those of the next man.

I believe there has been some mixed infection at work in these peculiar manifestations. What we see is not pure syphilis. So far as we can learn the man had no blood taint, diathesis, or other disease present in his system when this came. We must then accuse the unfavorable state brought about by the phimosis, restricting the circulation, favoring œdema, retaining secretions, and supplying the conditions of warmth and moisture necessary to the development of micro-organisms, which did not hesitate to join forces with those of syphilis (provided you accept an organism as the cause of this disease), producing the sloughing and the rapidly following ulcerations. Bear in mind, then, that there may be other mixed infections besides those of chancre and chancroid, and that early pustular features may depend upon outside pus-producing germs.

It is premature to speak to you of chemical products of bacterial life and their effects in syphilis, but there are suggestive possibilities which experimental research may some day realize. Everything seems to point to a bacillus in this disease, but until some particular one can be accepted, it seemed futile to discuss the changes which it may itself undergo or effect in the human body. Immunity would seem to be readily and logically explained by inoculation with attenuated virus, and it requires no stretch of the imagination to consider the mother of a paternally syphilitic child subjected during the term of her pregnancy to a continuous mild form of vaccination. While some mothers thus acquire immunity I feel that others may at least contract a modified form of syphilis, and I have had such women who, although never showing any recognizable signs of the disease, would become run down in health and recover slowly from other forms of

sickness, or complain of vague symptoms until a thorough antisyphilitic course was instituted, after which they would pick up and remain well.

Now I am aware, gentlemen, how indefinite this sounds; but it will help to show you once more that you must do much thinking for yourselves until these questions are finally worked out in anything like a definite manner. I want to bring before you for just one moment this mother and child (now over two months old). Although this little one is a trifle thin, you will agree that it is a fairly healthy specimen; the mother, too, as far as we can see or she can tell us, is in good health. When the child was born here the palms and soles were covered with bullæ, the central portion of the face from the forehead to the chin was covered with a mask-like, dusky-red infiltration, and the rest of the surface was scattered over with rather bright-red flat papules. Treatment was at once begun by daily inunctions of a mass of mercurial ointment equal to that of a large American pea. This was spread over the abdomen, and a flannel binder was applied over it, so that there was a more or less continuous absorption taking place. The eruptions, snuffles, fretfulness, etc., promptly disappeared, and the child has been gradually transformed from a hideous-looking object to a very creditable citizen. The mother is ignorant of any syphilis in herself or family; she is married, and states that she had previously borne a healthy child, which lived two years and died of diphtheria. Now, how can you account for this peculiar state of affairs? Here a little questioning is necessary. Are you sure the father of this child and the father of the first healthy one was the same? "Oh, not at all," is her reply; "I was married for the second time a year ago." How simple a matter it now is! Number two is a syphilitic, and has bestowed this inheritance. But how about the mother; has she escaped? Some will tell you the reason she cannot contract syphilis from her child is because she has the disease already. This is all well enough to say; but can they demonstrate it? She shows no signs, and if she goes for years or for life without any of the recognized manifestations of syphilis, how can they claim that she is syphilitic?

The last case I present to-day is one of the later eruptions,—*the ulcerative serpiginous syphilide*,—whose destructive lesions become crusted over, and which leaves extensive white cicatrices in the centre of the patch, which latter is constantly increasing in area by peripheral extension, due to the constant formation and breaking down of new tubercles. You see what an extensive region of this young man's chest is involved (Fig. 3). One enormous patch, made up of two which have

fused, reaches from the spinal column behind to beyond the median line in front, and from the axilla to below the free borders of the ribs.

If we are to go by the history, it is only some eight years since the chancre stage. Treatment was not very carefully followed out, and there has been no care exercised in avoiding alcohol.

Under these conditions we are apt to get the ulcerative eruptions, and the whole of what is usually termed the tertiary stage of syphilis is likely to be marked by troublesome outbreaks of one kind or another.

IRRITABLE BLADDER.

CLINICAL LECTURE DELIVERED AT COOPER MEDICAL COLLEGE, SAN FRANCISCO.

BY CLINTON CUSHING, M.D.,
Professor of Gynæcology.

GENTLEMEN,—This woman is fifty-eight years of age. She has borne seven children. The menopause occurred at fifty. While she is not a robust woman, her health has been fairly good, and her appearance at present does not indicate any serious trouble.

The symptom which troubles her is frequent urination. There is a desire to urinate every half hour or every hour, and the urine is excessive in quantity and almost as clear as spring water. A chemical examination of the urine has been made, and no sugar or albumen found. A careful manual and instrumental examination of the pelvic organs has been made, and the condition of the anus and rectum, the uterus and ovaries, and the bladder and urethra have been thoroughly investigated. The only local evidence of disease that was found was in the urethra. The mucous membrane of the urethra, so far as can be seen near the meatus, is of a dark red color, and the gentle introduction of a urethral sound into the bladder causes a burning and smarting sensation in the urethra and about the neck of the bladder. The bladder is not sensitive to the touch; the uterus and ovaries have undergone atrophy consequent upon the change of life, and the anus and rectum are free from disease. All the pelvic organs are somewhat displaced downward on account of injury to the pelvic floor while giving birth to some of her children. Reasoning from exclusion, then, we are forced to attribute the frequent urination to two causes,—first, to the excessive secretion of urine, owing to a disturbed state of the nervous system, and, secondly, to a congested and unhealthy condition of the mucous membrane of the urethra and neck of the bladder.

The kidneys, in common with all the secretory organs of the body, are largely influenced by the state of the nervous system. The urine in this case is of the character commonly known as hysterical urine,

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and is frequently seen in nervous women after some unusual excitement.

It is a curious fact that urine of low specific gravity, or even distilled water, is not as well tolerated by the bladder as normal urine.

Various methods have been devised for examining the urethra. I show you here two varieties of expanding valvular speculi. I also show you a tubular glass speculum with a long slot cut out of one side, this last is the most satisfactory instrument for the purpose of which I have any knowledge. Of late years several cystoscopes have been invented for the purpose of making ocular examination of the urethra and bladder, but they have not become popular, on account of the exceptional skill required in using them, the complicated machinery, and the unsatisfactory results.

The most satisfactory method of dealing with any obscure and troublesome case of urethral disease that fails to give way under the ordinary treatment is to lay the entire canal open up to the neck of the bladder, the incision extending entirely through into the vagina.

Then with a tenaculum in each hand the line of the incision can be widely separated and the entire urethral canal can thus be exposed to ocular examination. Furthermore, the operator is then in a position to apply the best method of treatment to the case in hand. The wound is easily and safely closed by a few silkworm-gut sutures.

The cause of the thickened and congested condition of the urethra in this case is not easy to determine, but I doubt not that the disease has been in existence for many years, and is probably one of the sequelæ of the congested and prolapsed condition of the pelvic organs that existed during the childbearing period, judging from the character of the injuries to the pelvic floor as evidenced by the injury to the perineum, and the prolapse of all the pelvic organs. The prognosis is good, for under proper treatment, symptomatically at least, the trouble will disappear. The following plan will be carried out here: Two ounces of triticum repens and one drachm of bromide of potassium are boiled for half an hour in a pint of water, this is strained, and the patient takes a wineglassful every two hours until all is taken. This decoction is made fresh every morning and is continued for a week, or until the symptoms of irritable bladder subside. The object of the medicine is to allay the irritability of the nervous system, lessen the amount of urine excreted, and render the bladder more tolerant.

The following suppositories are often used with good effect in a variety of painful affections of the urethra, where they are of a chronic character :

R Cocain.,
    Morph. sulph., aa gr. ii;
    Zinci oxidi, ʒi;
    Ol. theobromæ, q. s.—M.
  Make urethral suppositories no. 12.
        Sig.—Use as directed.

These suppositories are made about the size of a No. 10 catheter, and an inch and a quarter long. Once a day one of these suppositories is dipped in vaseline and introduced the entire length of the urethra by the physician and held *in situ* for a few moments until melted.

Under the general head of " Irritable Bladder," the books describe a state where frequent urination is the most marked symptom ; the act being attended usually with pain and more or less discomfort, and ending in some instances in strangury and great suffering.

In order to give an intelligent opinion, it is indispensable to make a painstaking and most careful examination, not alone of the urethra and bladder, but of all the pelvic organs.

It has been found that the cure of some troublesome cases of irritable bladder can only be effected by curing disease of adjacent structures. In other words, the affection of the bladder is a reflex one.

Among the common causes of irritable bladder enumerated, such as fissure of the anus, disease of the ovaries, prolapse of the ovaries, displacements of the uterus, stone in the bladder, stricture of the urethra, urethral caruncle, uric acid, crystals in the urine, urethritis and cystitis, fissure of the neck of the bladder, hysteria, and disorders of the nervous system, it would appear that the term "irritable bladder," like the term leucorrhœa or neuralgia, is, after all, only a name given to a symptom, and has little significance as far as the nature of the disease is concerned.

The symptoms of chronic cystitis are an intolerance of the bladder to distention and to contraction of that organ, and the presence of pus and mucus in the urine. But there may be a large amount of pus and mucus in the urine due to suppurative disease of the kidneys without the bladder being seriously involved.

In order to make a correct diagnosis in such a case it will be necessary to pass into the bladder the small catheter which I here show you, and introduce it into the ureter first upon one side then upon the other, allowing it to remain in each ureter for ten minutes, and by collecting the water in separate vessels from each ureter we are enabled to determine whether one or both kidneys are involved. The passage of the urethral catheter involves an accurate knowledge of the anatomy of

the parts, and the possession of considerable skill, although in some cases it is very easily done.

With the forefinger of the left hand in the vagina to direct the point of the instrument, if the opening of the ureter is patulous, the procedure is a simple one. If the disease is confined entirely to the urethra, the distention of the bladder is not accompanied by pain, the suffering occurring only while the urine is passing through the urethra. On the other hand, where a fissure of the neck of the bladder exists, · more or less uneasiness and pain are felt both in the urethra and in the bladder, with frequent urination and sometimes strangury.

A good instrument for determining the exact location of any disease situated in the urethra, or at the neck of the bladder, is the ordinary olive-pointed metal bougie. In examining the cavity of the bladder for stone, the ordinary steel sound is all that is necessary.

With the forefinger of the left hand in the vagina, and with the steel sound in the right hand, the cavity of the bladder can be very thoroughly examined and the presence of even a small stone diagnosed.

An enlarged and tender uterus, particularly if it is displaced downward and backward, is not infrequently a cause of irritable bladder, owing to its close connection with the posterior wall of that organ, and in many cases the bladder symptoms entirely disappear without any treatment other than the restoration of the uterus to its normal condition.

Fissure of the anus is a not infrequent and I doubt not a very often overlooked cause of irritable bladder. The nerve-supply of the anus and that of the neck of the bladder arise from practically the same source, and as a consequence any continued disease of one organ is very likely to involve the other in reflex or sympathetic irritation. Therefore, I · would suggest that you always make a careful examination of the anus in every case of irritable bladder.

Any painful affection of the ovaries, if long continued, is liable to disturb the function of urination. Pelvic peritonitis and pelvic abscess, with the accompanying effusion of lymph over the peritoneal surface, may for the time being produce an amount of irritation that may render the function of the bladder painful. When it is remembered that the urethra in women opens into the vulvar cleft, and that this part of the body is frequently bathed in muco-purulent discharge from the vagina, it would seem probable that urethral disease would be extremely common among women. In fact, if gonorrhœa be left out of the calculation, urethral disease is much more prevalent among

women than among men, due, doubtless, to the anatomical condition mentioned, also to the perils and injuries to the bladder and urethra at the time of childbirth, for these organs not infrequently get badly pinched between the head of the child and the pubic bone.

From what has been said, clearly the treatment must depend upon the cause. If from the symptoms the irritation is due to a fissure at the neck of the bladder, the gradual dilatation of the urethra with graduated sounds, the patient being under anæsthetics until the index finger can be introduced into the bladder, will often cure, the plan being in effect the same as dilating the sphincter ani for fissure. Independently of the local and surgical treatment, there are certain general rules that are applicable in all cases.

The patient should partake freely of demulcent drinks, such as slippery elm or flaxseed-tea, or even plain water in abundance, the urine thereby being rendered more dilute and less irritating.

An exclusive milk diet is also highly recommended. Ordinarily the use of salt meats, salt fish, salt, pepper, and vinegar are prejudicial. The free use of fresh vegetables is advantageous.

In many cases where the general health and especially the nervous system have become deteriorated from long-continued disease or bad habits, manifestly no good results can be obtained until the general system has been restored to something like its normal state. A warm sitz-bath of twenty minutes, taken at bedtime, is often very soothing. A rectal suppository containing a grain of extract of opium and one-third of a grain of the extract of belladonna, often proves useful when needed to allay pain or strangury.

There is one element in this case that deserves some further consideration. The change of life occurred in this patient eight years ago, and the adjustment of the system to the new order of things should be by this time tolerably well settled ; but with many women the annoying symptoms that often attend the occurrence of the menopause persist and recur for years after the complete cessation of the menses.

That time in a woman's life between forty-five. and fifty-five is commonly known as the critical period, and with reason, for it is at this age that cancer is the most frequently seen and various disturbances of the nervous system are common.

The monthly loss of blood ceases, the uterus, the ovaries, the vagina, and even the external organs of generation, undergo a process of atrophy, and return, to a considerable degree, to the size and form that existed before puberty.

The childbearing period having passed, the purpose for which these organs were created disappears, and with a retrograde metamorphosis.

Not infrequently the woman's health is greatly improved after the change of life is fully completed, and she is no longer troubled with the monthly loss of blood, and it is common to see a woman of sixty or seventy as active as a girl, and possessed of great endurance.

Frequently women take on a large amount of fat after the menopause, the fat-making functions being made more active when the blood-loss ceases. The sexual appetite is greatly modified or entirely disappears, and the function of nearly every organ in the body is liable at times to be disturbed. The brain and nervous system, however, suffer most at this age. Women often get very irritable and morbid; they are suspicious of those about them, at times being almost insane. They feel that with the loss of the childbearing function they are losing one of the principal charms of a woman; they realize that old age is indeed approaching, and they often feel bitter and rebellious, discontented, nervous, and hysterical. Flashes of heat pass over the body at regular intervals, and they often break out in profuse perspiration. Sleeplessness is a common and annoying symptom. It is probable that the hysterical urine secreted in this case is but a sequela following the menopause.

At any rate, in the absence of any more definite knowledge concerning the state of the nerve-centres we have given, in the form of the bromide, the remedy that is most likely to allay irritability of the nervous system and to meet the indications in the case.

SUPRAPUBIC CYSTOTOMY.

CLINICAL LECTURE DELIVERED AT THE MASONIC HOSPITAL, CHICAGO.

BY G. FRANK LYDSTON, M.D.,

Professor of Surgical Diseases of the Genito-Urinary Organs and Syphilology in the
Chicago College of Physicians and Surgeons, etc.

GENTLEMEN,—The case to which I wish to call your attention this
morning is a typical illustration of a class of cases which you will
frequently meet in practice, and which are among the most important
with which the genito-urinary surgeon has to deal. It is only fair to
say that the operative treatment of chronic disease of the prostate is as
yet in its infancy. Indeed, until recent years the treatment of pros-
tatic disease comprised only palliative measures. All forms of in-
ternal medication and various forms of local treatment involving
pressure, the object of which was to produce destruction of the adven-
titious tissue, had proven ineffectual; hence the profession accepted
what was supposed to be the inevitable,—i.e., the absolute incurability
of chronic prostatic disease. Surgical measures of a radical character
were considered inapplicable. Unfortunately, the old view still pre-
vails in the minds of many of the medical profession. It is a peculiar
fact that while the profession have unhesitatingly accepted the view
that operative surgery is now comparatively safe, under aseptic and
antiseptic technique, disease of the prostate is considered by the
majority of physicians to be a *noli me tangere.* I have no desire to
foster over-enthusiastic surgical activity, but I firmly believe that there
is a wide field for judicious operative measures in prostatic disease. I
willingly admit that radical measures are not judicious in all cases,
but I further believe that the results of operations performed by sur-
geons who operate upon any and all cases at haphazard should not be
taken into consideration in determining the relative value or safety of
prostatic operations. In some quarters it is held that surgical inter-
ference is not to be considered until the patient is in an almost hopeless
condition. The surgery of the prostate has never been given a fair
opportunity to show its range of application. The cases which are

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submitted to operation are usually those in which everything else has failed, and, worse yet, cases in which serious or even fatal complications have arisen. Operative statistics are at present based upon such cases as these. Such statistics are obviously worthless, excepting in so far as they bear upon the radical cure or recovery from the operation in desperate cases. With a definite conception of the limitations of, and indications for, radical operations upon the prostate and a judicious selection of cases, it appears to me that early operations should yield excellent results. Radical operations on the prostate ought to be comparatively safe, if performed before septic complications or renal disease have developed; in other words, if performed soon after the development of urinary obstruction. A fair prospect of success may be claimed even after bladder disease has developed, always providing the kidneys are not seriously impaired. Mechanical obstruction and infection of the mucosa of the genito-urinary tract develop sooner or later in prostatic disease, and in by far the majority of cases renal complications come on in due time. This being the prospect which presents itself to prostatiques, it is evident that operations should be done much oftener and at a much earlier period than is usually the case.

If you will permit me, I will take the liberty of presenting the classification of cases from an operative stand-point which I have elsewhere published. (Wood's "Twentienth Century Medicine.") I have divided cases of prostatic disease into,—

1. Incipient cases in men of moderately advanced age, with comparatively healthy bladder and kidneys.

2. Advanced cases in healthy patients in whom there is no renal disturbance and no serious involvement of the bladder, but in whom the urinary obstruction is gradually increasing.

3. Late cases in patients of advanced age with serious renal and bladder complications, but in whom palliative measures are successful.

4. Advanced cases, irrespective of age, in which serious complications are present and attempts at palliation are unsuccessful.

5. Cases complicated by stone in the bladder.

In the first class of cases strict attention to the rules of genito-urinary hygiene, with the occasional passage of a steel sound, may relieve the irritability of the vesical neck and retard the advance of the prostatic hypertrophy, or perhaps prevent it altogether. In some of these cases measures of palliation are so beneficial that no operation is to be thought of. If, however, attempts at palliation are only temporarily successful or fail altogether, surgical interference is justifiable, and should be practised before serious bladder and kidney disease

have had time to supervene. By waiting too long in these cases the patient's general health will be found to be greatly impaired by irritation of the bladder, chronic urinary poisoning, loss of sleep, etc.

The second class which I have enumerated comprises only the legitimate successors of the preceding class, and present the same operative indications.

In class three, palliative measures only should be considered. In cases of this kind an operation might have been justified at an early period, but it should not be practised as long as palliative measures keep the patient comparatively comfortable.

In the fourth class, the only hope of prolonging life and making the patient comparatively comfortable consists in operative measures.

The indications for operation, or rather the variety of operative procedure, is to be determined by the local conditions developed at the time of operation.

In the fifth class, I am free to say that suprapubic section, with or without operation upon the prostate proper, and followed by prolonged drainage, seems to me to be the indication. I do not deny that brilliant results are reported from the operation of litholopaxy in prostatiques. Suprapubic section and drainage, the section being performed in two stages, seems to me to be a more rational procedure than litholapaxy, especially if the bladder be extensively involved.

The operative measures to be adopted in hypertrophy of the prostate vary in importance from simple suprapubic section and drainage to removal of the diseased tissue. We should be guided in our selection of the operation by the variety of hypertrophy present, the condition of the bladder and kidneys, and the general health of the patient. In quite a large proportion of advanced cases with serious complications the bladder should be opened and drained. A permanent artificial suprapubic urethra is often almost arbitrarily indicated, and the operation is most safely performed in two stages. Chloroform is the anæsthetic to be selected in the majority of cases. I have frequently performed simple suprapubic section in two stages under cocaine. A weak solution of cocaine, one to two per cent. in a one-per-cent. solution of carbolic acid, is safer in some debilitated patients than general anæsthesia. When definite circumscribed prostatic tumors exist, they should be removed, general anæsthesia being usually necessary in this procedure. Pedunculated growths may often be removed with the finger alone. Where the bladder is in very bad condition, it is advisable to avoid temporarily, or perhaps permanently, cutting or tearing operations about the vesical neck. In such cases an extreme degree of

vesical sepsis exists, and very slight abrasions of the vesical mucosa may prove quite a serious matter. When the bladder and general condition of the patient have improved under vesical irrigation and drainage, more radical operative measures may be resorted to. Where prostatotomy or prostatectomy is decided upon, I favor through and through drainage. A perineal *boutonniere* may be quickly performed, and does not seriously complicate the operation. The younger and healthier the subject, the more liberty may be taken with the prostate. Prostatotomy or prostatectomy with through and through drainage in comparatively young subjects affords a much better prospect of cure than in older patients.

One of the most important points in connection with operations upon the bladder and prostate is the preliminary treatment. Rest in bed for a few days, with careful regulation of the diet and bowels and the administration of urinary antiseptics, adds greatly to the safety of any subsequent operations. I wish to warn you, however, against too great restriction of the diet in old and feeble subjects. Great care must be taken not to lessen the resisting power of such patients. The ideal urinary antiseptic is, in my opinion, the oil of eucalyptus. I administer it in ten-minim doses, four times daily, after meals and at bedtime. While the eucalyptus is disagreeable to the stomach of an occasional patient, I find that in the majority of cases it is well tolerated. Since beginning its use I have been relieved of a great deal of un- easiness regarding cases of chronic disease of the genito-urinary tract. I can heartily endorse it as the most satisfactory of all remedies which I have thus far tried for the purpose of securing urinary antisepsis. Boracic acid and salol have alike been somewhat disappointing. The proportion of my operative cases developing urinary fever has been greatly lessened since I began the use of eucalyptus.

The case which I will present to you this morning is a man, sixty- five years of age, in whom symptoms of urinary obstruction and irri- tation appeared at the age of fifty. Typical symptoms of prostatic hypertrophy finally developed, and numerous attacks of retention have been experienced. Palliative measures have been faithfully carried out for some years, but have latterly proved entirely ineffectual. One of the principal complaints is severe pain about the vesical neck and in the perineum during and after micturition. Micturition is very frequent, the patient being compelled to rise some six or seven times at night, and being still more frequent during the daytime. From the violent efforts at expulsion of the urine the patient has developed hemorrhoids and rectal prolapse. Great debility has supervened, and,

as you will see, the patient is now in a decidedly bad condition. Rectal examination discloses an enormous diffuse enlargement of the prostate. Examination of the urine shows severe chronic cystitis, but presents no evidences of organic disease of the kidneys. I wish to caution you against taking the condition of the urine as an absolutely safe criterion of the condition of the kidneys in these advanced cases of prostatic disease. In patients with such a history as this one presents, you are to infer that chronic disease of the renal pelvis, in all probability, exists; that the long-continued obstruction to urination has certainly impaired both the structure and function of the renal cortex. This inference is warrantable despite the absence of casts and the freedom of the filtered urine from albumen.

The symptoms presented by this patient are more or less indicative of the presence of a complicating calculus. You may wonder why 1 have not attempted to determine the presence or absence of a calculus by careful exploration of the bladder. I will simply say that in cases of this kind the indications for suprapubic section and drainage are so clear that I do not believe we are justified in performing a prolonged preliminary exploration which must necessarily be done under an anæsthetic. We thereby simply double the danger to the patient, and determine nothing more than might be discovered at the time of the radical operation which is absolutely necessary, whether a calculus be found or not. If we find a calculus, we will, of course, remove it. I will state, however, that no matter what the condition of the prostate in this patient may be, I do not believe that I will be justified in performing an operation on the prostate in the present condition of the patient.

The patient and his family have decided upon general anæsthesia, and while I think that the operation might be safely and readily done under cocaine, I will nevertheless have chloroform administered. The patient being now anæsthetized, we will proceed to irrigate the bladder and secure a condition as nearly aseptic as possible. The return flow of urine being quite clear, we will leave eight or ten ounces of a saturated boric acid solution in the bladder. I will now tie a piece of gauze about the penis in such a way as to compress the urethra, thus preventing the escape of the irrigating fluid during the operation. You will observe that the bladder is readily outlined through the thin abdominal walls of this patient, hence I do not believe that a rectal bag is necessary,—in fact, I find it can usually be dispensed with. I will now make an incision in the median line from a point two inches above the symphysis pubis downward almost to the root of the penis.

It is well to get as much room as possible at the lower angle of the wound, at which point the pelvic and abdominal viscera are protected by the pubic symphysis in such a manner that hernia is not likely to result. In exposing the bladder it is well to follow Guyon's method. The incision should be made as nearly in the median line as possible, and an effort made to enter the abdomen in the triangular space between the pyramidales muscles. If we find, however, that despite our efforts to enter at the median line we do not enter this space, we should cut directly through the rectus. In opening the abdomen the symphysis should be hugged very closely, the finger being introduced at this point and the deep incision being enlarged upward upon it. In this way all danger of wounding the peritoneum is avoided. As soon as the abdomen has been entered a cushion of fat presents itself, occupying the prevesical space or cavity of Retzius. Many surgeons advocate cutting or tearing through this prevesical fat. This, however, is not the safest method, as the peritoneum lies within this apron-like fold of fatty and connective tissue. I will, therefore, as Guyon recommends, pass my finger closely down behind the symphysis pubis to the vesical neck and roll or tuck up this layer of fat into the upper angle of the wound, thus exposing the bladder. Where I desire to do the operation in two stages, I pack the wound tightly with iodoform gauze in such a manner as to push the fatty tissue towards the upper angle and sides of the wound, thus exposing and keeping clear by the pressure of the gauze a considerable area of the bladder wall. I have decided in this case to open the bladder immediately. The bladder is readily discernible here.

The next step in the operation is to pass a couple of suspension sutures through the margins of the wound and the muscular tissue of the vesical wall. The ends of these sutures are left long and secured by forceps. If desired, they may be tied before the bladder is opened. You should always take the precaution to pass these sutures, for the reason that when the bladder is emptied it is often a difficult matter to bring it to the surface so as to render it accessible in the further steps of the operation. I now pass the scalpel into the bladder, making a very small vertical incision. Into this incision I pass the blades of a pair of ordinary hæmostatic forceps, the separation of which enables me to introduce the finger into the bladder without the necessity of enlarging the incision. This is an important practical point, for if simple vesical drainage be decided upon, the patient is much more likely to gain control over the artificial suprapubic urethra than if a free incision be made into the bladder, and in case the operation re-

solves itself into one of simple exploration with the finger, the closure of the vesical wound is a very simple matter. Indeed, after the finger is removed it is sometimes rather difficult to find the opening, inasmuch as the incision is relatively small, the required room being obtained by stretching, perhaps with slight tearing, of the muscular fibres of the vesical wall. Sweeping my finger about in the interior of this bladder, I find, as was shown by rectal examination, merely a diffuse enlargement of the prostate with considerable prominence of both lateral lobes, but no distinct median hypertrophy. No stone is present.

I shall in this case institute simple through and through drainage. I will introduce a staff into the bladder and make a median section of the perineum upon it. This incision, as you see, is very readily made; it should be merely large enough to comfortably accommodate a drainage-tube of moderate size. This drainage-tube I now introduce from below upward, having fenestrated that portion which will rest in the bottom of the bladder. I now thoroughly irrigate the bladder once more with a one to ten thousand bichloride solution. The upper extremity of the tube will be closed in order to secure drainage from below, and to prevent, as far as possible, the contamination of the wound above by escaping urine. The wound in the bladder wall is so small that the tube is hugged tightly by the bladder muscle, and if urine be prevented from escaping above by occluding the upper end of the rubber drainage-tube, infection of the superior wound may generally be prevented. I will introduce several sutures in the suprapubic wound, leaving a small space at the inferior angle, into which I will introduce a strip of iodoform gauze for drainage. The usual antiseptic dressings will now be applied. In this case I expect it will be necessary to permanently maintain a suprapubic route for the urine.

Gynæcology and Obstetrics.

PUERPERAL SEPSIS; ELEPHANTIASIS OF THE VULVA; MYOMA UTERI.

CLINICAL LECTURE DELIVERED AT THE JEFFERSON HOSPITAL.

BY E. E. MONTGOMERY, M.D.,

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PUERPERAL SEPSIS.

GENTLEMEN,—This is a patient whom I brought before you a week ago, suffering from puerperal sepsis, manifesting itself in phlebitis of the veins of the left leg, more particularly in the calf. The external saphenous vein was not involved, as is generally the case. She suffered a great deal of pain and distress in the leg; the limb was swollen, giving rise to what is commonly known as phlegmasia alba dolens, or milk-leg, so called from its frequent occurrence during convalescence following parturition. The leg becomes greatly swollen, distended, and glistening in appearance, presenting oftentimes pain and tenderness down the course of the vein. As this condition had continued for a considerable length of time, the miscarriage having taken place some four weeks ago, I concluded that it was better to carefully curette the uterus with the hope of removing any infectious material that might be contained therein which was acting as a centre of distribution to keep up the septic processes. Consequently we dilated, curetted, irrigated, and thoroughly packed the cavity with iodoform gauze. By curetting we removed a large amount of *débris*, which, without question, was the source from which the poison was distributed. In doing this operation, I had but little hope of its having any influence upon the inflammatory process in the vein; but as I bring her before you to-day, we find the septic condition in the leg has undergone complete resolution. She now experiences no pain nor distress in it, and complains only of trouble in the breast. My attention had

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not been called at that time to the disturbance in the mammary gland, although she says she had experienced pain in it for some time. When it was brought to my notice I directed that a belladonna plaster should be placed over it and the breast firmly bandaged. In spite of this, however, suppuration has occurred, and we bring her before you to-day for the purpose of treating it.

A septic inflammation of the mammary gland, or mastitis, is not an infrequent occurrence complicating puerperal convalescence. Such inflammations are divided into three classes, according to the portion of the tissue involved. Thus we may have a superficial inflammation involving the tissue external to the mammary gland, which is characterized by all the ordinary symptoms of inflammation in any other structure. Again, we may have inflammation occurring in the gland itself, involving the lobules, and, third, the subglandular inflammation, where it occurs beneath the gland. The source of origin of such inflammations is usually the entrance of septic material through a fissure, crack, or ulcer of the nipple. This occurs as a result of the efforts of the child in nursing. The nipple is possibly depressed and short; children with strong suction may not infrequently induce separation of the epithelial layer, causing a small blister filled with serum or blood. This breaking leaves exposed the absorbents through which septic material may readily enter, passing along the milk-duct into the gland or through the lymphatics into the superficial or deeper tissues. Inflammation of the gland may involve the entire gland or travel along a single duct, involving a single lobule. It is characterized by pain, swelling, increased weight of the breast, and frequently marked constitutional symptoms. In the subglandular variety the entire breast may stand out prominently, as if it were resting upon a cushion. Such abscesses, if the process is not interrupted, may lead to rupture in a number of directions. Under the old plan of treatment, where the breast was poulticed both before and after it had opened, the poultices became sour, and with the pus formed a source for the more rapid multiplication of germs, and it was not unusual for inflammation of the gland-structure to continue over weeks, months, or even years. First one tubule after another would become involved until the entire gland-structure was destroyed and the health of the patient broken down. The proper treatment of such conditions is very important. With the first manifestation of local and constitutional symptoms it is important that treatment should begin. The patient should be given a purgative, preferably one of the salines, in order to decrease the watery portions of the blood. She should be

given a dry diet, without liquid. The least objectionable liquid would be coffee. Locally an ice-bag should be applied to the inflamed surface, or if the parts are simply engorged and not too painful, the breast may be carefully bandaged, covering the gland with cotton, applying the bandage in such a way as to make equal pressure upon all parts of it, and thus decrease the amount of blood sent into the organ. In an inflamed, engorged breast, where an abscess is threatened, there is no plan of treatment more effective than the application of the ice-bag. This should be applied over a thin towel or other covering and kept on for an hour or so at a time, repeating this as frequently as the patient suffers pain. In a short time the engorgement will be arrested and the breast may then be bandaged with the hope of complete relief of the condition. Where suppuration has taken place the pus should be promptly evacuated. In making an incision into the breast, it should always be done in a line parallel with the course of the tubes, and not across them, as by cutting across a tubule, while the abscess may be emptied and the condition cured, the patient will subsequently have a lobe of the breast which has no exit for its secretion, and in every subsequent pregnancy would necessarily have trouble. In this patient we have opened the abscess, and a considerable quantity of pus is evacuated. We wash out the cavity with peroxide of hydrogen, introduce a gauze drain, and dress it with aseptic gauze. We will direct the breast to be held in place by the application of firm bandages. This will be removed as frequently as the dressing becomes soiled, the cavity again irrigated and dressed in a similar manner. In this way we shall hope to bring about the early cure of the condition without any further inflammation of the gland-structure.

ELEPHANTIASIS OF THE VULVA.

The next patient is a young lady twenty-four years of age, whom I had before you in the early part of the term suffering from an enlargement of the region of the vulva. She is pregnant now about five months, and I bring her before you to-day to show you the rapid development this growth has undergone under the influence of pregnancy. As the parts are exposed, you see a tumor nearly as large as the fist projecting more particularly to the right side, which involves the labia majora and minora, and also drags down the mons veneris and the prepuce over the clitoris until the latter organ is entirely obscured. The labium minus on the left side is also enlarged and œdematous, but it is not involved to the same degree as that upon the right. As we grasp this mass we find that it is hard and firm ; that its

surface is fissured, presenting deep cracks, and the mass is evidently one of hypertrophy of the connective tissue of the skin. Seeing a mass of this kind we would, of course, consider the possibility of its being one of a number of conditions. Thus, we find the vulva not infrequently is distended, the result of œdema or general anasarca. In such conditions, however, we would expect to find the limbs of the patient swollen, and other symptoms indicating the presence of some constitutional condition producing it. Œdema of the vulva may arise as a result of local conditions, and where it is present we find the skin thinned, glistening, presenting a smooth outline. Under pressure the distention can be decreased, and not infrequently pitting may be produced. You remember a patient whom I showed you a few days ago; the vulva was œdematous, indurated, and in that case the condition was due to the tubercular ulceration just within the vagina. We may also have swelling of the labium as a result of the pressure of a growth or a pregnant uterus upon the veins of the pelvis, causing them to be greatly distended, producing what is known as varicose veins; in such cases the swelling is likely to disappear when the patient lies upon the back or when the pelvis is slightly elevated, to reappear when she assumes the upright position. In this case, however, we find no enlargement of the veins. The mass drags down upon the anterior tissues. The vulva may also be the point of inflammatory disease, involving more particularly the glands of Bartholin, resulting in an abscess situated on one or the other side. Such cases, however, are characterized by the ordinary symptoms of inflammation, trouble of short duration, and do not present the want of sensitiveness and the induration, such as are exhibited in the mass before us. The size of this mass, its indurated character, the fissured condition of the skin, the apparent development of connective tissue, all characterize it as a case of elephantiasis of the vulva. You can readily understand that in the pregnant condition of this patient there is nothing at present to be done. An operation upon the diseased mass would result more than likely in the interruption of the course of pregnancy, increasing the danger of a septic process, so that we must allow this patient to go to the completion of her term without resorting to operation; but we may increase her comfort somewhat by directing her to wear a napkin or some suspensory bandage, by which the mass can be prevented from dragging. We can readily understand what an uncomfortable condition it must be to have so large a mass as this hanging between the limbs, subject to rubbing against them and her clothing and interfering with her locomotion. Were this patient not pregnant I should advise that an operation should be done for the

purpose of the removal of the labia minora on both sides, and a good part of the labium majus on the right.

MYOMA UTERI.

I now expose the abdomen of the patient whom we have been considering, to contrast it with the one just brought in. You see the abdomen here is quite large, the lower portion more largely developed, the enlargement extending a little above the level of the umbilicus and more prominent to the right side. The skin of the abdomen is covered with striæ, but they are pearly and glistening, not reddish, as we would expect to find in recent conditions; so they result from a prior distention of the abdomen. These striæ have no significance as to the particular condition of the patient, as they may result from any distention sufficient to give rise to rupture of the skin. In the other patient the swelling is situated in the lower part of the abdomen, and as I place my hand over it I find it offers a firm, resisting mass, which is irregular in outline, presenting a number of small, hard nodules. The swelling is a little more marked to the left side. Our knowledge of the relation of the abdominal viscera leads us to recognize that such an enlargement can only arise from the ovaries, tubes, or the uterus, rarely those obscure growths which have their origin behind the peritoneum. Ordinary retroperitoneal tumors are developed in the connective tissue, are soft and elastic, not firm and resisting, hence they would be excluded. We might have, possibly, exostosis or enchondroma arising from the sacrum; but such growths would necessarily be immovable, while this mass is a movable one. Growths of the ovaries are, in the great majority of cases, cystic. Solid growths may be fibromata or sarcomata. The former are usually small, and would be situated in one side of the pelvis, not occupying so symmetrical a position as is the case in this growth. They do not usually present nodules, but form a single mass.

Introducing the finger into the vagina, bringing it in contact with the cervix, we find that we are enabled with each movement of the tumor to move the cervix, consequently showing that this tumor is either a part of the uterus or very closely associated with it. As we more carefully practise the conjoined manipulation, you can see that by pressure in the vagina I am enabled to lift this mass up and render it more prominent, and by more carefully palpating it between the fingers of the two hands I am able to determine that it is a part of the uterus, consequently we are forced to the conclusion that this is a uterine tumor. Now, growths in the uterus may be either malignant

or benign. Malignant growths are carcinomatous or sarcomatous. The former are not usually attended with much increase in the size of the organ; the disease generally involves the cervix. It is attended with hemorrhage, with ulceration, with an offensive discharge, and with marked pain. Sarcomatous growths may be attended with considerable enlargement of the uterus, and are also characterized by hemorrhage, offensive discharge, rapid growth, and ulceration. In this patient the growth is firm and resisting. It is irregular and nodular; the nodules are felt projecting anteriorly, posteriorly, and laterally, more particularly upon the right side. The mass completely fills up the pelvis, makes pressure against the bladder, gives rise to a great deal of distress in retaining the urine. It also increases the difficulty of evacuating the bowels. The growth has been noticed something over a year; it has gradually increased in size; has been unattended with hemorrhage; the most marked symptom being the sensation of weight and pressure, and the pelvic discomfort resulting therefrom. The character of the growth, the length of time it has been in existence, lead us to conclude that it is necessarily a myomatous growth of the uterus, one in which there are a number of fibroids. Fibroid tumors may be divided into three classes, according to the situation. First, those which, as they increase in size, are forced out of the uterine wall beneath the mucous membrane, and known as submucous fibroids. As these still further become separated from the wall and pedunculated, they are known as fibroid polypi; second, those which in their origin are situated near to the peritoneal coat, and are subsequently pushed out into the abdominal cavity with an envelope of peritoneum. These are known as the subperitoneal. Third, those which are situated in the wall of the uterus, and are hence called interstitial or mural tumors. The more closely the tumor is situated to the mucous surface, the more likely in the subsequent growth is it to interfere with the circulation, leading to distention of its vessels, to points of ulceration, and, consequently, to hemorrhage as a prominent symptom. If it does not involve the inner wall of the uterus and affect the mucous membrane, it may attain to very large size without the patient experiencing anything more than the ordinary menstrual flow.

CHRONIC VULVO-VAGINITIS, ENDOMETRITIS, AND CATARRHAL SALPINGITIS; URETHRAL CARUNCLE; UTERINE FIBROID; PREGNANCY AFTER HYSTERORRHAPHY; DERMOID CYST OF OVARY; LAPAROTOMY; THIRD OVARY.

BY PAUL F. MUNDE, M.D.,

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GENTLEMEN,—This patient is thirty-two years old; has been married nine years; has had one child, and a miscarriage one year ago, since which time she has been sick, with pain in the back and lower part of the abdomen. She menstruates every four weeks for five or six days each time, the last menstruation being one week ago. She complains of much pain upon simple digital examination. Before my finger scarcely enters the vagina proper, it strikes posteriorly against several irregularities, upon moving which she complains of pain. These irregularities are the transverse folds of the vagina. On separating the labia for inspection, we see that the mucous membrane is very red, having the appearance commonly seen in acute, subacute, or bad cases of chronic vaginitis or vulvitis. She has been using douches, which is probably the reason why there is so little discharge to be seen. There is, however, some yellowish-brown discharge. Judging from these symptoms, I should make a diagnosis in this case of chronic vulvo-vaginitis. She says she came here for several months, and improved; but she has stayed away now for six months, and is, consequently, worse. The mobility of the uterus is slightly limited, and on moving it considerable pain is produced. The uterus is anteflexed in the second degree, the cervix is short and cylindrical; but there is apparently nothing in particular the matter with the uterus.

Great pain is experienced on touching the appendages on either side, and I have very little hesitation in making a diagnosis here, from the tenderness of the perimetria, of catarrhal inflammation of

the tubes, a chronic endometritis, and a resulting chronic vulvitis and vaginitis. It is a very common complication either of abortion or of gonorrhœal infection, or exposure to cold during menstruation or at other times may have caused a catarrhal salpingitis and an acute endometritis, which ultimately passed into this chronic condition. The vulvovaginitis is liable to exist just as long as the endometrium and tubes are affected. I make this diagnosis chiefly from the pelvic tenderness, and from the peculiar red and highly sensitive condition of the mucous membrane of the vagina and vulva. A more accurate diagnosis can only be made by examining her with the speculum, and seeing whether any discharge issues from the external os, and whether the lips of the cervix are eroded. Even then the discharge might have been removed just before this examination. In this case I will use the cylindrical speculum for examination, because it will show us the condition of the mucous membrane of the vagina progressively, and it will, furthermore, enable us to apply a solution of nitrate of silver to the vaginal mucous membrane more conveniently than can be done with the Sims speculum. This is about the only class of cases in which I use a cylindrical speculum,—i.e., where I wish to apply a fluid to the vaginal canal. If you use the Sims speculum, the posterior vaginal wall is covered by the speculum, and one is liable to make only an imperfect application to this portion of the vagina. Very often you will see the vagina under these circumstances dotted over with small red spots, which are in rows, following the lines of the folds of the vagina. These are the papillæ of the vagina which have become inflamed and hypertrophied, and the surface of which has become abraded by friction of the vaginal walls. When you apply a solution of nitrate of silver, of a strength of twenty or thirty grains to the ounce, which should not be exceeded for application to the vagina, you will find that only the raw places become whitened from the formation of an albuminate of silver upon them. You can tell by this whitening of the surface the extent of the abrasion of the epithelium.

You see that on wiping the mucous membrane with cotton there is a bloody discharge, which would not be the case if the vagina were normal. Occasionally there is difficulty in getting the cervix to pass into the field of the cylindrical speculum, and in such rare cases the sound may first be passed into the uterus, and then the speculum passed over the sound. Having exposed the cervix, I pour about one drachm of the silver solution into the speculum; then with a cotton swab mop the vaginal mucous membrane thoroughly with the solution, at the same time nearly withdrawing the speculum. By tipping the speculum the

excess of fluid is allowed to run out; the speculum is then pushed back, and a cotton tampon smeared with vaseline inserted into the vagina. In this case, the vaginal surface has become a uniform white. I also apply a somewhat weaker solution to the vulva. The treatment is finished by introducing a cotton pledget between the lips of the vulva. The patient is told to remove this cotton pledget the first time she has to pass water, and to remove the cotton from the vagina on the following morning. Then she is to use lukewarm douches containing two to four tablespoonfuls of the liquor plumbi et opii to one pint of water, every three or four hours, according to the intensity of the affec- tion. In the course of three or four days the patient will be greatly improved, and she will then return and you will repeat the application of nitrate of silver. The vaginal mucous membrane will be found to be much paler. The nitrate of silver application should be of the same strength this time. Similar home-treatment will be carried on, and three or four days later she will return for another application. After doing this a number of times, gradually using weaker solutions, the mucous membrane will have changed from this bright-red color to the normal light pink, and the tenderness will have nearly subsided. Some discharge will probably still persist, but it will be of the ordinary leu- corrhœal character, and the time has arrived for the use of an astringent · rather than of a caustic. I formerly used the officinal solution of tannin and glycerin, one to four; but for many years I have changed from solutions to dry applications, using for this class of cases a mixture of one part of iodoform to two parts of tannin. This is dusted in, or introduced with a spatula, and a dry tampon inserted. These applications can be repeated every second or third day until the mucous membrane has become perfectly healthy, and all tenderness and discharge have disappeared. It will generally take from two to four weeks, more likely the latter time. I have often seen patients who have been told by their physicians that they must be treated every day, but I rarely find cases which warrant such frequent applications. I refer particularly to intra-uterine applications. More than twice a week is not judicious, except in unusual cases, like those of hemor- rhage from subinvolution following a miscarriage. Under such cir- cumstances a uterine tampon may have to be inserted every day for some time. Of course, a tampon may be introduced daily for the cure of leu- corrhœa, etc., but it is seldom necessary, as the tampon can be so prepared as to remain aseptic for a longer period; it can be readily left in the vagina from two to four days, and every other day would be sufficiently often to insert it.

ENDOMETRITIS.

Our next patient is thirty-eight years of age; has been married a second time, one and a half years ago; has had four children, and menstruated for the last time two months ago. She complains of abdominal pains, frequent and painful micturition. There is also a profuse yellow discharge. She comes with the inquiry as to whether she has had gonorrhœa, as she states that her husband has some sort of a urethral discharge. This question is an impossible one for us to answer; there is nothing specific about the gonorrhœal discharge so far as the mere appearance and odor are concerned. The only way, so far as I know, in which the diagnosis can be positively made is by finding in the discharge the organism which is considered to be pathognomonic of gonorrhœa,—the gonococcus. To tell a woman she has gonorrhœa simply because she has a yellow, acrid, pungent discharge, would be laying yourselves open to a suit for damages and defamation of character, because you cannot prove it by any such symptoms, and even the existence of the gonococcus in the discharges would not always seem to be sufficient proof. There is nothing about the appearance of this woman's genitals to prove to me that she has any irritation from infection. There is a yellowish-white discharge, such as is seen in ordinary leucorrhœa, but, of course, with the history she gives that her husband has a urethral discharge, it behooves us to be careful to avoid carrying contagion by means of this discharge on our fingers. Introducing the cylindrical speculum, the external os is seen to be slightly lacerated, but not eroded, and there is absolutely no evidence of anything more than an ordinary leucorrhœal discharge. Her adnexa are apparently normal. The wisest plan for her is to use douches containing a tablespoonful of borax to a quart of water.

URETHRAL CARUNCLE; UTERINE FIBROID.

This patient is thirty years old; has been married ten years, and has had four children, the last one six weeks ago. She complains of pain on both sides of the abdomen, and of a constant yellow discharge. She is nursing yet, and is, therefore, practically in the puerperal state, for it is usually two months before the uterus returns to its normal ante-pregnant condition. She says that the pain induced her to go to a physician, who told her she was "torn."

On examination, we find quite a profuse bloody discharge of a dark color, such as might come from an inflamed endometrium. There is a slight laceration towards the right, and the cervix admits the finger-tip.

Its lining membrane feels soft and velvety, probably from an erosion. It is quite likely that the blood came from this surface. Some of this discharge may be from the passage of the sound into the uterus, which is still in a hyperæmic condition, the new mucous membrane not being entirely reconstructed. There are two other points. On the external genitals we find a peculiar appearance at the meatus urinarius, a red raspberry-like growth, which almost entirely closes up the orifice of the urethra. It is known as a urethral caruncle. On inquiry, we find that the patient has had what she calls "inflammation of the bladder," and on passing a sound into the bladder, she complains of much more pain than is usual. This you would expect on account of the recent cystitis.

Urethral caruncles may be the result of the hyperæmia of the organs during pregnancy. They are often present without producing any symptoms, while in other cases they will cause much pain on walking and passing water, so that the patient will seek advice solely on this account. You notice that the caruncles are situated all around the urethra, as is shown by their relation to the sound. More commonly they are about the posterior portion. This fact leads to the suspicion that this may be a prolapse of the mucous membrane of the urethra. I have seen it projecting as a mass as large as the first joint of my thumb. The only cure is to cut them off with curved scissors, and then cauterize the base with nitric acid. This is rather painful, and many patients prefer to take an anæsthetic. I always dilate the urethral canal, because severe tenesmus often follows this little operation, and by dilating the urethra immediately with the ordinary modified Ellinger steel dilator you will prevent this source of discomfort. It also usually makes it unnecessary to catheterize the patient. Dilate sufficiently to allow of the introduction of the little finger. Ordinarily, you should not pass the index finger into the urethra except for diagnosticating some growth in the bladder. Where there is prolapse of the urethra, excision is also necessary. Cut off the prolapsed membrane, and then stitch the edge of the mucous membrane of the urethra with very fine catgut to the edge of the mucous membrane of the vestibule. If this be not done, a contraction of the meatus will probably occur, and leave the patient worse than before.

The differential diagnosis between prolapse of the urethra and urethral caruncle is made by recollecting that the latter cannot be replaced, and that the mucous membrane is covered with small disjointed nodules.

The second feature in this case is one of which the patient is not aware; she has a small subperitoneal fibroid projecting from the ante-

rior right wall of the uterus, probably of about the size of a small egg. It is readily felt by bimanual palpation, but the fundus uteri cannot be readily made out, and hence this is one of the comparatively rare cases where it is necessary to pass the sound to determine the position of the uterus. This fibroid probably existed during pregnancy, and in no way either interfered with the confinement or causes her present pains. There is a small laceration of the cervix, but it is entirely too soon after confinement to think of operation, and probably after a while it will be so contracted as not to demand an operation. Where the woman is anæmic, and the uterus needs to be contracted, a mixture of iron and ergot, although a strange combination, is very efficacious; but when there is profuse menstruation, depending upon subinvolution, laceration of the cervix, vegetations, a fibroid tumor of the uterus,—in fact, from whatever cause, no matter how much she may need iron, if you give it before removing the cause of the menorrhagia, the flow will be increased. If a fibroid, remove it if possible, or reduce it by the steady use of ergot; if from vegetations, scrape out the uterus and apply tincture of iodine to its cavity; if she has subinvolution, give ergot; if a lacerated cervix, scrape out the cervical canal and sew up the laceration. *Then* administer iron, and she will improve. While waiting for the removal of the cause, her condition may be improved by the administration of other tonics, such as strychnine and quinine, along with good food. In this case the flow is not caused by the fibroid; it is a consequence of the confinement.

PREGNANCY AFTER HYSTERORRHAPHY.

This next case is one of much interest, and is the first one of its kind that has come under my observation. Nine months ago she came to Mount Sinai Hospital for a sharp retroflexion. I found on repeated trial that, owing to the great relaxation of the vagina, no pessary would support the uterus. She had had three children. I concluded to perform Alexander's operation of shortening the round ligaments. At the time of the operation I said to those present that occasionally the ligaments were so slender that they broke off, and were really useless as a means of supporting the uterus. This happened to be the condition in this patient, so that an incision was made only on one side. Wishing to do something for her, I made an incision through the abdominal walls, half-way between the umbilicus and the pubes, barely two inches long, and brought the fundus uteri up with a sound, so that I could readily see it through the incision, scraped the fundus raw with a knife, and passed two deep silk sutures, grasping the fundus uteri just in front

of the round ligaments with one suture, and just above the Fallopian tubes with the other. These were then tied and the abdominal wound closed with three silkworm-gut sutures. A pessary was introduced to relieve any strain upon these sutures. The patient made a perfectly uneventful recovery. This operation, known as hysterorrhaphy, occupied only seven minutes. After leaving the hospital she was not seen for some time. She returned about one month ago, saying she had not menstruated for two months, and complaining of nausea and "bearing-down" pain. Examination showed the uterus enlarged to about the size of a two months' pregnancy, with the uterus in exactly the position in which it was placed at the operation. The womb is now still more enlarged, and the patient is undoubtedly pregnant. I shall watch the case with great interest, for it is the first instance in my experience where pregnancy has followed this operation. The question naturally arises, How can the uterus grow upward with the fundus attached to the abdominal wall as already described? The fundus uteri, so far, is not much above the point of attachment, but the uterus has enlarged posteriorly and laterally, and I believe this woman will not abort. Four of my cases of Alexander's operation, where the fundus was held forward by means of the shortened round ligaments, have gone on to term, and have had a natural confinement, and the uterus has been found afterwards in the normal position. The pains of which this patient complains may be due to the dragging upon the attachment to the abdominal wall. I have done this operation of hysterorrhaphy about a dozen times; I do not, however, subscribe to it unconditionally. In one case I performed it for the purpose of curing a prolapse of the uterus, which is not, of course, a dangerous condition; yet the woman died, and the post-mortem examination showed no peritonitis. Before death there was distention of the abdomen and persistent vomiting. The exact cause of death here could not be ascertained, but the operation is, of course, unjustifiable for conditions which are not dangerous.

DERMOID CYST OF OVARY; LAPAROTOMY; THIRD OVARY.

This young woman was sent to me for a retention cyst of the left Bartholinian gland, not being aware that there was anything else the matter with her. Examination showed a tumor on the left side about the size of an orange. It was movable, and was undoubtedly the left ovary. The right ovary was slightly enlarged. After watching her for a week I found the tumor had increased markedly, so I advised laparotomy. It has been my experience that when such a tumor begins to grow and causes pain, it is likely to be of a dermoid nature, and it

is liable to become inflamed, and the pedicle twisted, and to form adhesions, so that the difficulty of a subsequent operation is much increased. The operation was performed, and I found a dermoid tumor of the left ovary containing a tuft of hair about the size of an egg, and some sebaceous matter. The right ovary was enlarged, showing cystic degeneration. It presented a peculiar structure at one end, which almost formed a second ovary. This was one of those cases in which it might have been easily possible to have left this small portion behind, and then afterwards she might have conceived, and the operator would have been at a loss to account for her condition, thinking, of course, that both ovaries had been entirely removed. A few such cases are on record. Of course, if the Fallopian tube had been removed, such a mistake would not be likely to occur. Winkel has portrayed in his photographic plates several cases where there was a third ovary. In the operation on this patient, the two pedicles were stitched into the abdominal wound, and you can feel that the uterus is up against the abdominal wall. The retention cyst was opened, curetted, and treated with iodine, until it closed by granulation.

THE TECHNIQUE OF ABDOMINAL SECTIONS.

BY KENNETH N. FENWICK, M.A., M.D.,

Professor of Gynæcology in the Queen's University, Kingston, Canada.

GENTLEMEN,—I wish to explain to you to-day the method which I adopt in these operations which you have all seen me perform. I always prefer to operate in the morning, because both body and mind are then refreshed after the night's rest and better able to undertake work which requires a large amount of both physical and mental effort. The patient, too, is in a better condition than if she waits till later in the day, especially when she must necessarily take little or no food.

The anæsthetic.

Ether is to be used, unless contraindicated by—

1. Renal disease.
2. Atheroma.
3. Chronic bronchitis or asthma.
4. Where a lamp or cautery has to be used.

Rules.

1. The patient must have no solid food for at least four hours before taking the anæsthetic.

2. Examine the heart.

3. Measure the quantity of urine in twenty-four hours and examine it chemically and microscopically and estimate the quantity of urea.

4. Loosen the dress about the neck and chest.

5. Remove false teeth and any foreign body from the mouth.

6. Before beginning the anæsthetic give a hypodermic of morphine, grain $\frac{1}{8}$, atropia, grain $\frac{1}{100}$.

Use a cone: begin with a small amount of ether largely diluted with air. Tell the patient to breathe fully, deeply, and quickly. Then push it. Watch the respirations and keep the finger on the temporal artery constantly. Keep the mouth and throat free of mucus with a sponge or swab. The patient is ready when the eyelids can be raised

without resistance and the cornea is insensible to the touch. It is dangerous to operate during partial anæsthesia. If vomiting occurs turn the patient on her side, call for a dish or towel, open the mouth, and with a swab clear out the throat and pharynx.

If ether is contraindicated chloroform may be used.

Rules.

1. Smear the face with vaseline and tell the patient to keep her eyes shut.

2. Apply the chloroform drop by drop on a mask.

3. Insist on the recumbent posture.

4. The vapor must not be given too suddenly nor too long without allowing fresh air to be inspired.

5. Failure of the pupils to respond to light or their wide dilatation is a sign of approaching danger.

6. With chloroform there is more danger from syncope than asphyxia, so watch the pulse closely. This is the opposite from ether, where the immediate danger is asphyxia, and hence the recumbent posture is not so absolutely necessary as in giving chloroform.

In using either anæsthetic, if the breathing is labored draw the tongue forward with forceps and press forward the lower jaw.

If the heart is weak, as indicated by the pulse, inject hypodermically strychnia, grain $\frac{1}{60}$, digitaline, grain $\frac{1}{250}$.

In syncope from chloroform invert the patient, use artificial respiration, faradic battery, and inhalation of amyl nitrate, or give nitroglycerin hypodermically.

PREPARATION FOR A CŒLIOTOMY.

I. The patient.

1. Internal treatment.

Two days before the operation she is given a purgative of calomel or a compound cathartic pill, followed in the morning by a dose of Rochelle salt.

The night before the operation the bowels are again to be moved by a large enema of soap and water. The patient is also during this time to be kept on a diet of broth and soup.

2. External treatment.

Two days before the operation the patient is given a thorough bath, puts on clean clothing, and goes to bed, where she remains until ready for the operation.

The abdomen is rubbed with a saturated solution of potassic permanganate until of a mahogany color, this is washed off with a saturated

solution of oxalic acid, a compress smeared with green soap is left on abdomen all night, and washed off again with bichloride solution (1 to 2000) in the morning, and a compress soaked in this solution is tied on and left until the patient is on the table and anæsthetized. When the patient is ready for the operation the abdominal pad is removed by the nurse, four towels, which have been previously sterilized, are pinned above, below, and at each side of the abdomen, while underneath the upper and lower towels are spread two squares of rubber sheeting, over all this is placed a large piece of sterilized gauze, and when ready to begin the operation a hole is cut with scissors sufficiently large to give room for operation. Just before the operation the nurse has washed out the vagina with soap and water and a bichloride douche is given. The patient is also catheterized; the catheter, being of glass, is boiled before use and kept in a solution of bichloride.

The patient is dressed in a woollen night-gown and stockings.

II. The operation.

1. The operator, assistant, and nurses.

They must take a general bath the night before and put on clean linen and underclothing. The operator and assistant are dressed in clean white yachting suits and rubber-soled shoes; the nurses in short-sleeved white overalls; while all visitors must remove coats and put on clean linen aprons. When the operation begins no one is permitted to enter or leave the room, and no talking is allowed.

The hands are to be washed with hot water and green soap, the nails being cut short, carefully cleaned with a piece of wood or sharp rubber and a nail-brush. They are then soaked in a saturated solution of potassic permanganate, then in a saturated solution of oxalic acid, and finally in bichloride solution (1 to 1000).

2. The operating-room.

The operating-table, instrument-table, and table for sponges are all of plate glass and metal.

The metal part of the table is made of gas-pipe, and with metal tanks underneath the top can be connected with the hot-water tap and filled with hot water, so that in cases where there is likely to be much shock the table becomes practically a hot-water bed, and limits the amount of shock very considerably.

A steam-sterilizer containing dressings is at one side of the room, as well as reservoirs of sterilized water, hot and cold.

A large glass irrigator full of normal saline solution (six-tenths of one per cent.) is near the table ready, if required.

The patient's head is towards the window, so that the Trendelen-

burg position may be used if necessary. The operator then stands to
patient's right hand, and his assistant on her left side. At the assist-
ant's elbow is the principal nurse (1), who directs the rest and hands
the sponges to the assistant, taking them from the nurse (2), who stands
behind her at the table.

Another nurse (3) stands at the instrument-table, threads needles,
and hands the instruments to the operator, and has a dish of bichloride
and another of normal saline solution, so that the operator may rinse
his hands of blood, etc., during the operation.

As time is always an element in the causation of shock during an
operation, every means should be employed to promote expedition and

Fig. 1.
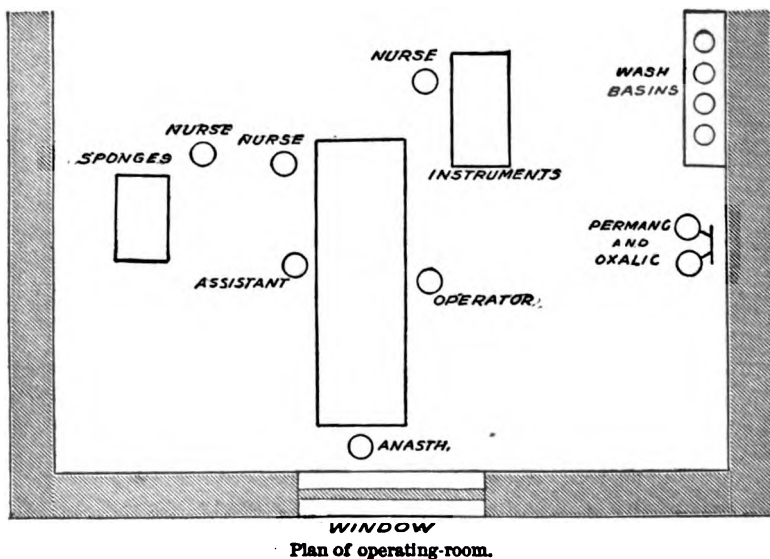
Plan of operating-room.

economize time by having everything ready to hand, and directions
carried out with military order and precision.

The silk ligatures and silkworm gut are put in test-tubes, and, with
the instruments, needles, towels, and linen overalls, are all sterilized
just before the operation.

Reef-sponges are never employed, but sponges made of sterilized
gauze, enclosing absorbent cotton, are used instead. Eight small ones
and two very large ones are carefully counted out just before, during,
and after the operation before closing the abdominal wound, so as to
be sure that none are left inside.

The incision is seldom at first more than three inches long, through

Fig. 2.—Operating-table adapted for the Trendelenburg position.

Fig. 3.—Operator, assistants, and nurses in readiness for a cœliotomy.

Fig. 4.—The patient has been anæsthetized and the surgeon is prepared
to make the first incision of the cœliotomy.

skin and fat; without a director the sheath of the rectus is then incised, and the muscle torn through with the fingers exposes the peritoneum, which is incised between catch-forceps.

When the operation is completed the pelvic cavity is carefully sponged out, the omentum replaced over the bowels, and the wound closed by interrupted silkworm-gut sutures, taking in all the structures in order, so that they will be accurately adjusted when brought together. This will be facilitated by running the loop of the last stitch from the previous one up to its place before tying the knot. The wound is then dried, dusted with iodoform, and a sterilized gauze dressing applied, with absorbent cotton and a Scultetus bandage around all.

III. The after-treatment.

1. While the operation is going on the bed is being warmed by placing underneath the bedding bottles or bags of hot water, which are removed just before the patient is brought to her bed.

The patient is carefully removed from the table to her bed, and a nurse sits beside her to watch the patient in case of vomiting, when a towel is placed under the chin, and the head turned so as not to allow vomited matter to enter the windpipe.

The patient must not be left for a moment until the end of the third day after operation, when she can usually be put in charge of the general nursing system.   .

After the danger of shock has passed there is the danger of hemorrhage, which is indicated by a quickly-increasing weak pulse, paleness of the face, and faintness. If the pulse reaches 120, the nurse must summon the surgeon at once.

The patient should be catheterized six hours after the operation, and this must be repeated at the same interval of time until the third day is over.

To allay nausea, due to the anæsthetic, the patient's head should be low, and cloths wrung out of cold water applied to it.

The stomach should have complete rest from food for twenty-four hours, but if thirst is great, she can have frequent sips of hot water, and after twenty-four hours she can have small draughts of cold water.

2. The bowels.

On the second night the patient is to have two pills of aloes, belladonna, and strychnia, and if the bowels do not open on the following morning she is to have an enema.

Then the diet should be barley-water or toast-water, broths or

chicken-soup, but *no milk*. Then toast and tea, rice, custard, soft-boiled egg, boiled fowl, and finally meat and full diet.

If there is flatulence, a turpentine enema is more effectual than anything else.

If the bowels are still obdurate, give calomel, grain i, with sodium bicarbonate, grains v, every two hours for four doses, alternating with magnesium sulphate and magnesium citrate, of each one drachm in one ounce of water, and, if necessary, follow with another enema.

3. The getting up.

Uncomplicated cases can usually be propped up in bed about the tenth day, and sit up at the end of two weeks. The time of remaining in bed is usually longer in hysterectomies. A bandage should be worn in all cases for several weeks after recovery.

I seldom use drainage now, because, by means of the Trendelenburg posture and the hand electric lamp, I can see to stop all bleeding points in the pelvis, and thoroughly cleanse out all fluids, so that the pelvic cavity is almost dry before I close the abdominal wound.

In some pus cases, where I do use drainage, I prefer a straight glass tube and leave it for three or four days, drawing out the fluid with a syringe at intervals of from half an hour to twice a day, according to the indications; and after removing the tube I insert a strip of gauze in its place, changing this twice a day, then daily for two or three days.

I think drainage is indicated only—

(*a*) Where there are extensive adhesions, and hence free oozing.

(*b*) Where pus has escaped and flushing of the peritoneum has been necessary.

(*c*) Where hemorrhage is feared, and one wishes to be early warned.

This careful technique has given the greatest satisfaction, and the results fully justify the care with which my directions have been faithfully carried out.
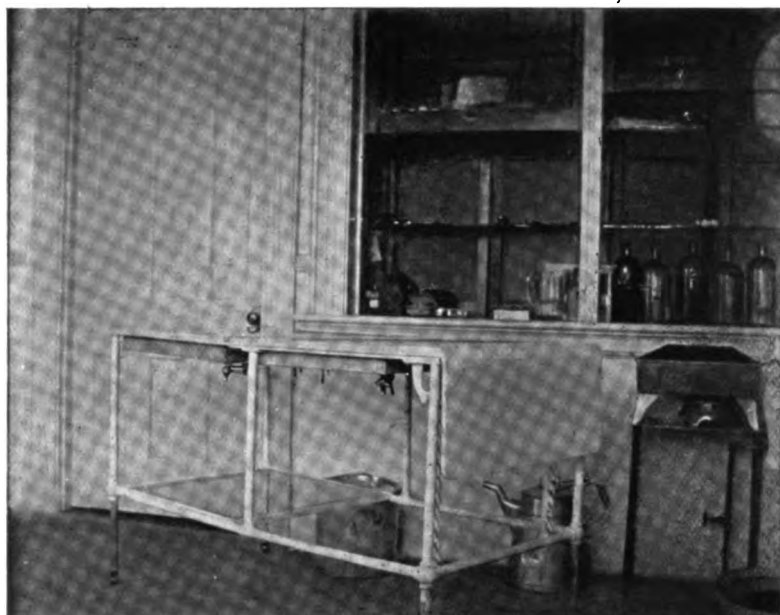
FIG. 5.—A corner of the operating-room.
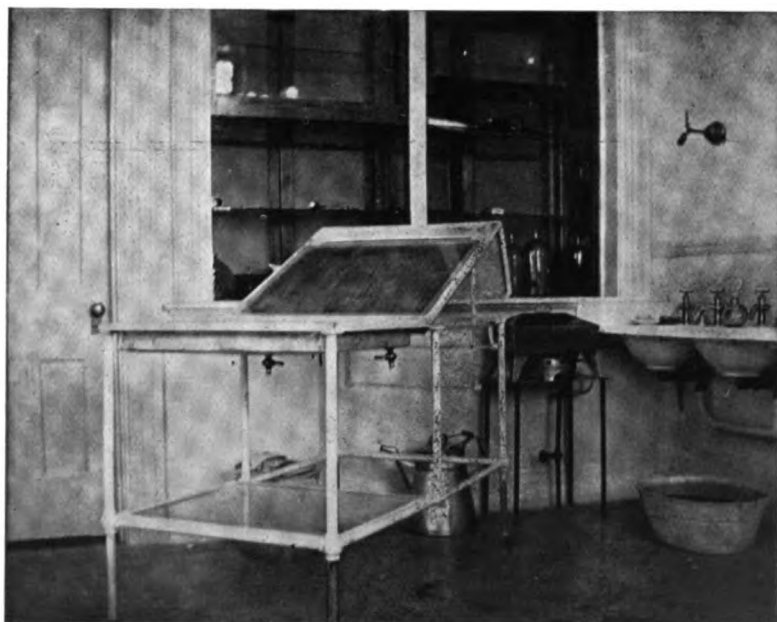
FIG. 6.—The aseptic operating-table of iron and glass.

MENORRHAGIA DUE TO CHRONIC ENDOMETRITIS; AMENORRHŒA.

CLINICAL LECTURE DELIVERED AT THE BUFFALO GENERAL HOSPITAL.

BY MATTHEW D. MANN, A.M., M.D.,

Professor of Obstetrics and Gynæcology in the University of Buffalo, New York.

GENTLEMEN,—This patient has been sent to my clinic for advice with regard to operative interference. The history of the case is interesting, though by no means remarkable. It is just such a case as you are likely often to meet with in your practice. The patient has been sick eleven years. She began to menstruate when fourteen, but for nine months after the first period she did not menstruate. After the flow was established it was irregular ; sometimes anticipating the usual time, sometimes being delayed, but always pretty free. Shortly after her marriage her trouble began with a " flowing spell," which lasted about two months, although she was not confined to bed all the time. A year later she had an attack of dysentery and another " flowing spell." After the lapse of another year, that is, nine years ago, she had her first child. The confinement was normal ; she was up in a week and made a good recovery. The child is still alive. Her health was fair till the birth of the next child, two years and four months after the first,—a little over six years ago. She was attended by a midwife, who " wrenched the child from her," causing considerable pain, which continued through the puerperium. Since then she has been continuously under the doctor's care. She has been flowing almost all the time. She complains of a pain in the right flank, and a hot, burning pain running up and down the small of the back. Her menstrual periods have occurred every two weeks, and have lasted so long that there have been intermissions of only two or three days. She has occasionally passed clots. Two years ago she had a miscarriage from some unknown cause, and since then she has been worse. Last summer she flowed for five weeks steadily. Her doctor, she says, stopped the flowing with medicine. She has never had any local treatment.

The history is one of menorrhagia amounting almost to metror-

rhagia. The woman shows by her pallor that she has lost a great deal of blood, and whenever there is a history of passing large clots, you can be sure that more blood is lost than should be. Notwithstanding the long duration of her trouble, our patient has borne two children at term and has had a miscarriage, so that the disease cannot have seriously crippled the sexual organs. Very often these troubles are functional, particularly in young girls. Such cases can be treated medicinally often with the result of complete recovery. The drugs that I have used most are the fluid extracts of hamamelis and hydrastis,—sometimes alone, sometimes in combination. This patient, however, would hardly be amenable to treatment of that kind. Certainly, in a woman who has had children, and who has been flowing for so many years, it is absolutely indispensable to make a vaginal examination. I do not find a great deal of organic trouble to account for the symptoms. The uterus is, perhaps, one-third larger than it should be, and is the seat of what, for want of a better name, we call chronic metritis. It lies forward in its normal position, and there is an antecurvature, but no displacement that can be called pathological. On bimanual palpation, the uterus is found to be very tender. Pressure upon the cervix or upon the fundus, through the abdomen, causes pain. When I move the uterus, as I can do quite readily, I find that not much pain is complained of. This is quite diagnostic, indicating that there is no inflammation of the perimetric tissues. Behind the uterus I touch neither tubes nor ovaries, nor do I find any mass of pelvic exudate or tumor.

We are forced to look for the cause of the trouble entirely inside the uterus. How then are we to account for the pain in the left side? I notice in many cases that pain in the left side may be due to endometritis. When a sound is passed into the uterus, pain is felt in one side or the other, and very much more often in the left side, a little higher than the ovarian region. The physician who sent the case to me thought there might be a small fibroid in the uterus. There may be one in the fundus, which is quite large, but I cannot map it out distinctly, and, therefore, I have a reasonable doubt as to its existence. The only way in which we could positively determine this point would be to dilate the cervix fully with tent or dilators, and then pass the finger into the uterus and explore it. Another indication exists for dilating the cervix. Undoubtedly an endometritis exists, and probably of the granular variety, on account of the history of prolonged flowing. The old treatment of this affection consisted in curetting the endometrium, without further attention. But latterly it has been

learned from experience that scraping away the effects of inflammation will not remove the inflammation itself. It is necessary not only to remove the granulations, but to adopt such means as will lead to a restoration of the integrity of the lining membrane. A year or two ago I should have said that this end could be best attained by intra-uterine treatment with the applicator syringe. But this method has proved tedious, and in some instances a failure, so that I have come to prefer the newer operation of rapid dilatation, followed by curetting, and leaving the uterus packed with iodoform gauze. This operation is performed with every antiseptic precaution and under full anæs-thesia. Sometimes it must be repeated several times, and occasionally, after a thorough trial of all means, we find that a chronic endometritis is intractable. In these cases it is perfectly justifiable to remove the ovaries, and thus, artificially, anticipate the atrophy of the uterus at the menopause. The operation is attended with a very low death-rate, not more than one per cent., and the patients are already incapacitated for child-bearing. Still, oöphorectomy should be regarded as a last resort, not to be tried till other less radical measures have failed.

AMENORRHŒA.

This patient is an antithesis to the one whom you have just seen. Although twenty-two, she has never menstruated, and she complains of peculiar nervous symptoms which are not very definite, so that I shall make a physical examination under ether anæsthesia. The hymen is small, and the entire vagina is small and perfectly smooth. At the upper part of the vagina I feel a uterus no bigger than the end of my finger. There is a little dimple corresponding to the external os, and this points directly upward as the patient lies on her back. With one finger in the rectum and one in the vagina, I can map out the uterus exactly, and I find it to be very small. The rectum is greatly dis-tended with gas. I can touch the posterior wall of the pelvis with the finger in the vagina, and can follow the entire length of the sacrum. There is a justo-minor pelvis, and the external genitals are undevel-oped. In short, though our patient is twenty-two years old, she has the sexual organs and pelvis of a girl of ten or twelve, and this ex-plains why she has never menstruated. There is no reason to suppose any impervious condition of the uterus. Passage of the sound would do no good, and I do not care to use it merely for the sake of deter-mining this point.

Since the age of sixteen she has had symptoms about as follows: Every month the abdomen swells up and becomes tympanitic; then

spots of ecchymosis break out all over the body, and they are some-times five or six inches in diameter. There are no accompanying sen-sations of pain or itching. There is, however, a vague discomfort, such as we would expect during the menstrual period. The spots last two or three days, and then fade away, and the patient is comfortable until the next month. What can be done for this patient? It is probable that the ovaries are present, and that the symptoms described constitute a menstrual molimen. The nervous system calls for men-struation, but the actual flow cannot occur on account of the undevel-oped condition of the uterus. The hemorrhagic spots represent a vicarious menstruation; they are not due to disease of the blood-vessels or of the other tissues of the body, but to a nervous cause. Although the ovaries do not originate the nervous impression which calls forth these various manifestations, yet in some way their presence is necessary for the menstrual molimen to occur, and by their removal the unpleasant symptoms with which the patient suffers may be obvi-ated. Local or medicinal treatment would have little or no effect, and the girl's physical condition is such as to demand relief. You will ask me if it is justifiable to remove the ovaries in a young woman without serious ovarian disease. In this patient I should consider the operation perfectly proper. The infantile uterus and the undeveloped pelvis preclude the possibility of child-bearing. Pregnancy would result dis-astrously, even if it could occur; but the vagina is so small that I believe sexual intercourse would be impossible. The patient, therefore, would be a great deal healthier without the ovaries than with them. Their function is useless, and they serve only to make her miserable. The conjugate diameter of the pelvis is between two and a half and three inches. The pelvis can be of use, obstetrically considered, only as a rare and interesting specimen.

FŒTAL PHYSICAL DIAGNOSIS.

CLINICAL LECTURE DELIVERED AT THE LOUISVILLE CITY HOSPITAL.

BY FRANK C. WILSON, M.D.,

Professor of Diseases of the Chest and Physical Diagnosis, Hospital College of Medicine, etc., Louisville, Kentucky.

GENTLEMEN,—I desire to-day to bring to your notice a subject which is too often neglected in medical courses, but which is so important that I take pleasure in spending an hour with you in studying the subject of "fœtal physical diagnosis," and hope to show forcibly the exceeding great importance of this method of diagnosis, as better fitting us for our duties as obstetricians. Many children, and mothers too, have been sacrificed for the want of a little knowledge, which this simple examination would have afforded before delivery. The more I have practised it, the more have I become convinced of its great importance, and astonished at the almost utter disregard among obstetricians of the great assistance it renders in the management of labor cases.

By fœtal physical diagnosis we mean the application of the various methods of physical diagnosis to the examination of the fœtus *in utero.*

It is always best to make this examination several weeks before delivery, for information gained at that time may be the means of changing an unnatural into a natural labor, and possibly of saving the lives of both mother and child. I make the assertion boldly that, were this method of examination in successful and universal practice among obstetricians, the operation of internal version for shoulder presentation would soon pass into oblivion, for nothing is easier than to recognize these cases, and they are just as easily corrected by external version ; and yet we hear constantly of children thus lost and mothers greatly endangered for the simple lack of knowledge so easily acquired. We need never then hear of the puncture of the pregnant uterus and possibly the destruction of the fœtus by the trocar used for the removal of the supposed ascitic fluid, nor of the contemplated operation of ovariotomy for the removal of a live fœtus at six or seven months. A

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knowledge of fœtal auscultation would have prevented many a miscarriage brought on by the imprudent use of the uterine sound.

Not only may we thus learn the presentation and position of the child, but its condition and sex may be determined with more or less accuracy. In cases of protracted labor, the failure of the strength of the child may be detected in time to save its life by manual or instrumental assistance. The location of the placenta is easily determined, so that, if adherent, the knowledge is of great use in its removal; disease of the placenta may sometimes be detected. Very few patients, when the subject is presented to them in the proper light, will object to the examination, and when it is over they will respect you the more for it. The patient should lie symmetrically upon her back, with the thighs very slightly flexed and the abdomen lightly covered.

Inspection, palpation, percussion, and auscultation will each in its turn be of service.

By inspection we may learn the general contour of the abdominal enlargement, whether it be the usual pear-shape or broader, as in cases with shoulder presentations. Where there are twins, placed side by side, there is usually a depression or sulcus between them, and the uterus is broader transversely.

By percussion we mark out the outlines of the tumor which gives dulness, while the stomach above and the intestines on either side give tympanitic and tubular resonance.

By palpation we can not only feel the outlines of the uterine tumor, but can frequently recognize the prominent parts of the child, as the round, hard, bony head; the softer and more cushiony breech; the knees, the feet, the elbows, and the back. The movements of the child may also be recognized, if alive.

Auscultation is by far the most important, and by it we may learn whether the fœtus is alive, and its condition; the presentation, the position, and the sex; the location of the placenta and funic obstruction, and, after delivery, frequently the time of actual separation and tearing off of the placenta. There is no necessity for the use of a stethoscope, as the ear placed upon the abdomen can recognize and locate the various sounds. The gurgling sounds formed in the bowels are easily recognized, and, of course, disregarded.

The soft, blowing murmur, synchronous with the maternal pulse, is the utero-placental bruit, and is heard most distinctly over the seat of the placental attachment. The sound varies very much, and during a pain is at first intensified, then abolished, to return again when the pressure from the contracting uterus subsides. In this way we may

distinguish spurious and inefficient pains from the genuine and more efficient ones. When the placenta is being torn off by the contracting womb, we may hear a distinct tearing sound, and the placental bruit will cease.

The sounds produced by the movements of the child are of two sorts : either of a rubbing character, when caused by its changing position and rubbing against the walls of the uterus, or like a stroke, as when the child strikes its limbs against the uterine walls.

The rapid double pulsating sound is the fœtal heart-beat, and will be found to vary from 110 to 170 per minute, thus easily distinguished from the maternal heart-sounds, which are sometimes heard even in the abdomen. Notice its fulness, strength, and regularity, as indicating the condition of the child, the more important during a tedious labor, when a failure in its strength would warrant manual or instrumental assistance.

The point at which it is heard with greatest intensity will indicate the presentation and position of the child. From the manner in which the fœtus is folded up in the form of an ovoid, with the arms flexed upon the breast, it follows that the heart-sounds will be transmitted most distinctly through the back ; and, as the heart is in the cephalic half of the ovoid, necessarily we will have a vertex or breech presentation, according as the sound is heard in the lower or upper segment of the uterus, and the occiput will be to the left or the right, as the heart is heard to the left or the right of the median line. We have thus the data for determining both the presentation and the position.

In cases where there are twins we will hear the heart-sounds at two points, usually differing in rapidity, and generally one in the lower and the other in the upper segment of the uterus.

It is important to note the rapidity of the heart-sounds, for we may thus tell, with more or less certainty, the sex of the child. In tabulating a large number of cases, varying from 110 to 170, I found the average was 134 to the minute. I take this, therefore, as the dividing line between the sexes. Above that point the sex will be female, the certainty increasing the higher the number ; below 134 the sex will be male, increasing in certainty as you descend. In a paper published some years ago, from an analysis of one hundred and twenty-six cases, I tabulated the following rules for determining the sex :

From 110 to 125 the sex will be almost certainly male.
From 125 to 130 the sex will be probably male.
From 130 to 134 doubtful, with chances in favor of male.
From 134 to 138 doubtful, with chances in favor of female.
From 138 to 143 probably female.
From 143 to 170 almost certainly female.

Out of one hundred and six cases whose record has been kept, of those whose hearts beat from 110 to 125, there were thirty-five males and two females; of those beating from 125 to 130 there were thirteen males and two females; of those beating from 130 to 134 there were eight males and four females; of those beating from 134 to 138 there were five females and two males; of those beating from 138 to 143 there were seven females and two males; of those beating from 143 to 170 there were twenty-four females and two males.

Thus we see that although the sex may not be determined with absolute accuracy, yet we can certainly make a very shrewd guess.

Occasionally there is heard a soft blowing murmur, resembling the placental bruit, but differing from it in rhythm, being synchronous with the foetal heart instead of the maternal pulse. This can only be caused by some obstruction to the circulation in the funis. An obstruction sufficient to give rise to a murmur may be caused, first, by simple compression of the cord between the prominences of the child and those of the mother. In this case it would not be permanent, but would probably disappear whenever the child changed its position. Second, by a knot in the cord, as sometimes occurs where the funis is long and the child slips through a loop in it, and the knot may afterwards become drawn so tight as to obstruct the circulation. In this case the bruit would be permanent, but might be heard at various points, not being confined to one place, and moving with each movement of the child. Third, by the cord being twisted around the neck of the child, particularly if it be passed around more than once. In this case the bruit would be permanent and heard near the situation of the neck of the child, usually just above the pubis. Hearing this should warn the obstetrician to be on the lookout for such a complication.

The only remaining sound which may be heard is produced by the decomposition of the dead foetus. The gases generated make their way through the tissues with a fine crackling noise, which can be distinctly heard, particularly when pressure is made upon the tumor. Where all the other foetal sounds are absent, and this crackling sound is heard, we may safely conclude that the foetus is dead, and that decomposition has commenced.

In the study of this subject I have been intensely interested, and I have presented it with the hope of awakening a more general interest in a practice which, I believe, will greatly tend to mitigate the horrors of that ordeal througn which all mothers have to pass.

I will now give you a practical illustration of the manner in which

WILSON'S RECORD CHART

OF

FŒTAL PHYSICAL EXAMINATION.

Case, ... *1* .... Name, ... *A. S.* ....

Age, ... *24* .... Date, ... *January 10, 1895.* ....

Children, M .. *2* .. F .. *1* .. Period of Gestation, ... *8½ months.* ......

Diagnosis, Pres., ... *Cephalic.* ...... Position, ... *L. O. A.* .. Sex, ... *Male.* ......

Placental Attachment, ... *Left lateral segment.* ....

Inspection.   Percussion.

Pear Shaped.   Ausculation.
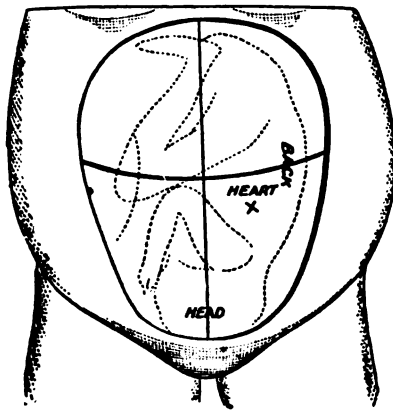
Palpation.

Delivered, ... *February 4.* ....

Presentation, ... *Cephalic.* ...... Position, ... *L. O. A.* .. Sex, ... *Male.* ......

Placenta, ... *Removed because of post-partum hemorrhage and*

found as indicated.

this examination should be made by bringing before you several cases from the Obstetrical Ward, and give you an opportunity of making the diagnosis for yourselves.

The first case presented shows an abdominal enlargement, pear-shaped, larger above than below, and, upon palpation, the arched back can be felt distinctly on the left side, the bony head just above the pubis, the soft breech at the fundus, and, as the abdominal walls are thin, the outline and shape of the feet can be detected in the right upper segment of the uterus. The fœtal heart-sounds are heard in the left lower segment, and, when counted, are found to beat 120 to the minute. The child is, therefore, in the first position and cephalic presentation. The placental bruit is distinctly heard on the right side of the uterus.

For the purpose of more conveniently preserving the record of such examinations I have had prepared the accompanying chart, which, filled out with the data from this case, shows at a glance the exact position and presentation, with the attachment of the placenta.

CASE II.—F. L., aged thirty, the mother of four children, entered the hospital two weeks ago, being then about seven or eight months pregnant. You will notice as you inspect the abdomen that the tumor is much broader than the other case, and seems flattened above, and in each flank there is a decided prominence. Percussion confirms our conclusions as to the shape of the tumor. Upon palpation, we can distinctly feel a hard, round, ball-like mass upon the left side, with a soft, cushiony mass upon the right side. The smooth, arched back can be detected above the pubis, and, upon auscultation, the fœtal heart can be heard a little to the left of the median line, and beating 155 per minute. We have, therefore, a transverse or shoulder presentation, the back being in front.

As it is yet three or four weeks before delivery we can convert this into a natural or cephalic presentation by bimanual or external version. By simply placing one hand above the head on the left side and the other hand below the breech on the other side, the head may be pressed downward towards the pubis and the breech upward to the fundus.

Now you see that the position is entirely changed, and it corresponds in every respect to the first case examined. With proper care this case may be saved a dangerous labor. It is not sufficient to simply practise version in this way, but the case must be watched closely up to the time of delivery, and during the early stages of labor to see that the child is not thrown back into its old position by the uterine contractions.

[NOTE.—This case was delivered four weeks later, the child being

in the first position and of the female sex, the mother being thus saved a dangerous and tedious labor, and the life of the child probably saved.]

If this examination had been made after labor had progressed and the membranes had ruptured, then external version could not have been accomplished, and nothing would have been left but to practise internal version. Valuable information has been afforded by the examination in indicating to us which hand to use in searching for the feet.

In this way the case is converted to the first or most natural position, and the danger both to mother and child of manual assistance during an unnatural labor is averted. After the version is successfully accomplished it is necessary to watch it closely up to and during the first stages of labor, for there is a strong tendency to throw the child back into the faulty position during the active uterine contractions. A little watchful care will prevent this, and as soon as the os dilates enough to allow the head to descend there is no further danger.

I trust that the hour we have thus spent in the study of the subject of fœtal physical diagnosis may enable you to more intelligently and successfully discharge your duties as obstetricians.

MISCARRIAGE CAUSED BY ENDOMETRITIS; RE-TAINED DECIDUA; CERVICAL ENDOMETRITIS WITH HYPERPLASIA AND CYSTOCELE; IMPER-FECT RESULTS AFTER TRACHELORRHAPHY.

BY ALEX. J. C. SKENE, M.D.,

Professor of Gynæcology.

GENTLEMEN,—This woman is thirty-five years of age; she has been married fourteen years and has three children, the youngest a little over a year old.

In August, she tells us, the menstrual flow had been absent three months. Then she had a profuse flow with uterine pain, which was supposed by her attending physician to have been a miscarriage; but in the discharge no trace of an ovum was discovered by him.

For three months preceding the suspected miscarriage she had morning sickness and all the symptoms that had accompanied previous pregnancies. Hence we may accept the fact that she was pregnant in August and then had a miscarriage. Since then she has had attacks of uterine hemorrhage, but no true menstrual flow.

The hemorrhagic attacks came on irregularly, the last one on the night of January 4, and then it was profuse.

The uterus is enlarged and soft, but whether the enlargement is due to an incompleted miscarriage or subinvolution cannot be determined by bimanual examination alone.

This case is of very great interest, first, with regard to its diagnosis. We have to use extreme care in order to make sure of what the real condition is before adopting any form of treatment, because she may still be pregnant. I do not believe, from the history, that she is; especially am I convinced of that from the facts; I am farther persuaded that she is not so because Dr. —— has so decided. The history in itself would be almost sufficient to settle the question of her having miscarried, and yet it is not wise to be too sure of that. We

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have the history of cases of pregnancy where all the evidences of miscarriage exist,—*i.e.*, where there is all the history of miscarriage, but positive evidence is lacking; and here let me offer one point, one exceedingly important fact, which will come to or from the department of obstetrics, but cannot be repeated too often,—*i.e.*, no one can be absolutely sure of a patient having miscarried, unless he has seen the products of conception. This may seem to you of very little consequence, but it is of very great significance, and you must remember it. Recently, before the holidays, a trial was concluded in favor of one of the physicians of this city who was sued for malpractice, for producing miscarriage. He was arrested and indicted on the evidence of the physicians who saw the patient afterwards and examined her. They took the history of the case, and on the strength of that declared that in their opinion she had miscarried. They neither of them saw the conception, or any of the products of this conception. Subsequently this patient was examined by a number of experts, who declared as positively that she never had been pregnant. Dr. Lusk, professor of obstetrics in Bellevue, said, if he was not under oath he would say positively that she never could have become pregnant, such was the character of the uterus and the reproductive organs generally; and yet another distinguished practitioner—I need only say that he is a graduate of this institution—gave it as his opinion that she had miscarried. Dr. Jewett and myself hardly think that was possible. I tell you now that no man, no matter whether he has had one or fifty years' experience, can answer positively, especially when his statement may send a *confrère* to prison for six or seven years. No man would dare wisely to make an affidavit that the patient had miscarried, unless he had seen the products, and been in close proximity to the place where they came from. It would not be enough if an embryo had been presented with the statement that it came from the patient in question. We have heard of bogus babies, so we might have bogus embryos, especially if some thousands of dollars or a reputation were at stake. This is important in practice, because you must insist upon it if you attend a case of that kind, more especially where there is a moral, legal, or ethical question. It is highly essential in a case like this, because if we take the history as offered, it all points with reasonable certainty to a miscarriage; that it was complete or partly so, and part of the embryo at least had been expelled. Even if she has not miscarried the embryo is dead and is only a misfortune to her, and an annoyance and danger that should be removed. So everything indicates that the duty of the present hour would be for us to empty that

uterus, or to remove the cause of her menorrhagia, and yet with due caution and care and counsel (there is where counsel comes in), because judges, juries, and lawyers always accept the results of consultation, rather than the statements of women.

It is a protection, two heads, in such cases, being much better than one, because it often saves one head. It is necessary while we are taking care of patients to look out for and take care of ourselves, knowing if we are true to ourselves we cannot be false to our patients. Let us review this case again: she was supposed to miscarry in August, the third month of pregnancy. We are sure of one thing: if she is pregnant at all, it must be a pregnancy of six months' duration. Another point, she might have miscarried and become pregnant again. We have got to look out for that. She would hardly have become pregnant, because she has been having menorrhagia. I think we can be positive that she cannot be six months pregnant. We want to see in what condition this uterus is, and thus find out what the cause of her menorrhagia is. Now she is suffering from menorrhagia as a consequence of an imperfect miscarriage. We expect to find some of the products of inflammation and a portion of the decidua ordinarily in these cases, which are exceedingly common. The color of the mucous membrane in this case is not indicative of gestation, and yet that alone is not sufficient. The appearance of the cervix may give us some better indication. She has a cervix that shows imperfect involution; it is larger than it ought to be. First of all, we have examined the cervix in the usual way. I find on the posterior walls of the uterus what I think is a decidua; I detach it or a portion of it. This patient illustrates what we so often see,—*i.e.*, occasionally after pregnancy the ovum dies from cause. In this case I presume that the cervical endometritis, having travelled upward, at first interfered with the ovum, and finally destroyed it. This is one of the most common causes of miscarriage. The woman miscarries imperfectly, in an incomplete sort of way. The sac becomes ruptured, the fluid drains off, the uterus does not detach it and throw it off *en masse*. You will find those cases where the ovum ruptures giving you the most trouble. When the ovum is expelled completely and fully the uterus is completely empty, and if blood clots accumulate in the uterus they are thrown off, and a portion of the decidua remains; in this case there is enough to cover the posterior wall of the uterus, and the only way to give relief is to take away what is dead,—*i.e.*, to detach it, remove it, if you can, but at any rate thoroughly and completely detach it, and the manner of doing this is in no way different from ordinary curetting.

I call your attention to the method of curetting. It is the same for a retained portion of decidua, or very like it, as for a result of endometritis; the treatment is invariably curetting,—*i.e.*, the treatment and the mode of operating ought to be the same whatever the neoplasm may be. There is only one exception, and that is when there is a menorrhagia due to a fibroid growth in the body or cavity of the uterus; that is called a fibrous polypus, meaning thereby that it has a peduncle. The curette will not remove this, but it will enable you to complete your diagnosis. In all cases of fungosities and in cases of retained placenta or decidua, curetting is the means invariably used to treat it. I told you some time ago that the old method was to dilate the cervix first with the sponge tent, and after that had been accomplished, to remove it and use the curette. Operate in Sims's position with Sims's speculum, and fix the uterus so that you can hold it while you are running the curette over its surface. It is not always necessary to dilate the cervix. It is usually sufficiently dilated to admit the curette to do the work thoroughly. By omitting it you avoid great suffering to the patient and one of the great dangers. Slow dilatation by means of a tent is the greatest possible kind of irritant, and induces inflammation, just as a piece of wood in your hand, if allowed to remain long enough, would excite inflammation. The moment it enters it stimulates and irritates. The decomposition is so rapid in a sponge tent that it generates diseased material, or gives such material a chance to establish itself. Dilatation is not necessary as a rule, and it is better to avoid the sponge or any other kind of tent. If a little dilatation is necessary it can be done in a moment under the influence of cocaine with the ordinary dilator. I will show you the curette I use. The first has never been improved on in principle. Here I also show you a pair of Sims's curettes, sharp, cutting, stiff, unyielding instruments. In Sims's hands they were safe, in other hands the most dangerous instruments one could use. Dangerous, because they will cut normal tissue, and if you are not skilled you will plough into the body of the uterus with them and do harm. Decidua or polypi, composed mostly of mucous membrane, break down very easily, and so you require a blunt instrument, one that will remove and scrape off the morbid material and not injure the walls of the uterus. With this instrument of Sims you always do more than you want to do, because it is strong, unyielding, and cutting. The curette I use is made on the precise principles of Récamier's curette. His was a double-ended instrument, with scooped ends and a stiff handle, made like an F. I had this one made so that it could be bent readily. I tried the instru-

ment and found that it was easily adapted to the cavity of the uterus, and stiff enough to remove the decidua, polypus, or anything that could be removed with the curette, and yet so flexible that it does not do the slightest damage whatever, so that it is a perfectly safe instrument. It is some sixteen years, I think, since I had it made,— that is one of the originals. Sometimes I have had a new one made too stiff, then I have had it reduced in the handle to make it more flexible.

In using this instrument you are always safe, if it is clean. Did you notice to-day that I have handled those instruments and took them as they were given to me without raising the question if they were thoroughly sterilized? I was sure that they were, and then asked myself, would it be safe to handle them before passing them into the uterus? The last thing I did was thoroughly to scrub my hands, so they were surgically clean, and the instruments would not then be contaminated. It is very easy to carry bad material into the uterus with instruments. We must take care that we have clean hands and clean instruments. Then with this instrument I have full confidence that you can curette without doing the slightest harm.

Since I began the use of this instrument I have had no untoward symptoms following curetting. I have curetted patients in my office and allowed them to go home, but would not advise you to do this. A case comes a long distance for menorrhagia; I go over the causes of menorrhagia; I find it must be due to some inflammation in the body of the uterus, some fungus or some malignant disease. I pass in an exploring curette and remove a portion. I see that it looks like fungous material. If the growth is not malignant, then the temptation is to go all over the ground. You do that, and then remember she has a mile or two to go home. I have done that two or three times in my enthusiasm, but it is not wise, because something might happen. Although your hands are clean, there might be some septic material in the uterus itself, and there might be septic absorption. There is nothing original in this instrument that I like so much; it is the same as the original Récamier, but made flexible. I began curetting under the teaching of Sims, who was the first one I ever saw operate. The patient was anæsthetized and the sponge tent removed; it had been in twenty-four hours. The pain was very great, and he could not get his patients to tolerate the operation without an anæsthetic. I began the practice on one of my first patients in the wards of the hospital here, and did fairly well; but not as well as Sims. He was so educated in his touch that he knew what to take and what to leave.

I had only one idea,—to be sure and remove all the abnormal growth of the fungosities, but I also removed part of the wall of the uterus; as a consequence that patient gave me so much trouble both of body and mind that I have never used that instrument since. You will say "it is your own fault;" but if one man can do mischief with that instrument, another can. One thing more about curetting. You will often find you cannot bring away all the material that you detach, but you can wash it away. If you are careful you will be sure to remove *all* that there is to remove. If not, you simply have to repeat the operation, and that is always objectionable. The patient objects; because she is not cured on the first effort she does not like to submit to another, unless you have previously told her it might be necessary to do it again, and all patients are usually reasonable enough to expect that. If you assure them that you will relieve their trouble and then fail, they object if you find it necessary to repeat the operation. Sometimes, in the case of fungosities, after you have used the curette the fungus may return; but, as a rule, one curetting is all-sufficient if complete.

There is just one practical point I wish you to bear in mind : you cannot see what you are doing, so you must guide your hand in accordance with a mental picture of the anatomy of the part and gain confidence by experience. I pass the curette up to the fundus, then to one side; then pass it up and down, and slowly to the other side, being careful not to miss any part. It is better to go over the ground twice to make sure.

Another point: after your curetting, note if the blood stops; if so, you have been thorough; but if there is a little oozing during the next few hours, you have not gone over the ground sufficiently. The laceration of the blood-vessels in the fungosities starts the bleeding; it is evident that a portion of the fungus remains.

CASE II.—Forty years of age; married nineteen years; has had six children, the youngest five years old. A year ago she had a miscarriage. For months the menstruation has been regular, until the last two months, during which it has been irregular, coming twice each month; urination and defecation are both painful; there is also prolapsus of the bladder. The cervix uteri is very large. This patient has a deep laceration which has existed a long time. She has an endometritis with it. The cervix uteri is enlarged; new tissue has been formed by proliferation, and the question is, whether it is malignant or not. This question comes up very often in these old cases of laceration and is always a very important matter to decide.

In the first place, the first thing I notice on digital examination

is this cystocele. The same test we have applied in abdominal hernia we apply here. When she coughs the bladder is pushed clear outside. Prolapsus of the bladder, or cystocele, is the trouble. The cervix is smooth, covered with normal mucous membrane, and somewhat eroded. There is nothing apparently malignant about this case, and yet it is not always an easy matter to be sure. I thought it would be much more difficult to see whether there was any malignant trouble there or not. We get cases where we are unable to say positively. In this case I find there is hyperplastic tissue which I recognize, also some little degeneration has gone on, denuding the epithelium and eroding it, but there is enough to recognize that there is normal mucous membrane. But suppose I had found it covered with masses of vascular material, bleeding easily, on touch somewhat soft, then it would be impossible to say positively whether that was commencing epithelioma or simply mucous membrane denuded of its epithelium and undergoing hyperplastic growth. You would say, by all means remove a portion of it, and send it to the pathological department. Very easy, if near the Hoagland Laboratory; but if in the State of Washington, and not a microscope within a hundred miles of you, you cannot avail yourself of that. But you know that this is simply a pathological change, and the result of long-continued inflammation. You know it will become normal if you treat it. Put your patient under treatment, and the mucous membrane, if it does not become normal, will approach the normal. Your therapeutics prove the diagnosis, so you can always do that. If it is malignant, your treatment amounts to nothing. As soon as you destroy a portion of it another crop of this material comes up again, so the treatment amounts to nothing. In either case, however, the best way is to remove the abnormal tissue, restoring the cervix to its normal condition, whether it is malignant or not.

CASE III.—This woman is forty years of age; she has been married twenty-five years; she has had nine children and four miscarriages. She complains of headache, backache, and pelvic tenesmus. The cervix uteri is lacerated, and has been operated on, but no satisfactory result has been obtained.

This is one of those cases we have not succeeded in giving entire relief to by operating. It was a bad case. It is a question whether that is the cause of her present suffering or not. It may be that her suffering is not at all due to the condition of the cervix. I want to see if there is not some other trouble. I have a suspicion that there was some ovarian or uterine trouble in addition to the laceration. If we find there is still some damage there, and if it is not being repaired,

we shall operate again. If we find that the result of the operation is good, and does not seem to be the cause of the trouble, we will find what it is. It is always well to examine those cases five or six months after the operation.

In some cases at the end of six months the cervix looks better than immediately after the removal of the sutures; at other times the improvement is not so great. The case was an unusually bad one; the cervix was three times the normal size. At the time of the operation a great deal of indurated tissue was removed. I found that the upper portion of the laceration had united very nicely, but the result was imperfect; so we must operate again.

PROLAPSUS UTERI.

CLINICAL LECTURE DELIVERED AT THE HÔPITAL TENON, PARIS.

BY L. G. RICHELOT, M.D.,

Professor (Agrégé' Paris Faculty and Surgeon to Tenon Hospital.

GENTLEMEN,—The deviation of the uterus backward is often the position of a real prolapse of the organ, but, nevertheless, the clinical history of uterine deviations or displacements differs entirely from that of falling of the womb, because the uterus can be, and often is, retroverted or retroflexed while it still remains in its place in the pelvis. There is a giving way of the pelvic floor, but resistance of the perineal one. The therapeutics of prolapsus is quite a special one, just on account of this weakening of the vulvar ring.

The falling may, like a hernia, be produced by some sudden effort, but this is rare; as a rule, it is produced slowly and progressively in women that have too soft tissues, and it is somewhat similar to the so-called " hernia from weakness." During pregnancy the vaginal walls are hypertrophied, and the uterine ligaments are so distended that it is a frequent occurrence after confinement to have a prolapsus take place before the normal involution has been completed. It is possible to find cases that, from some unexplained congenital predisposition, have occurred in quite young unmarried women. I had a case in a girl of sixteen, a virgin, who had a complete vaginal prolapsus, that was only cured after several operations.

The prolapsus of the vaginal walls rarely precedes that of the uterus, except in cases where the whole mass has fallen at once, but, as I have said, these are very rare cases, where it is possible to admit that the vagina draws the uterus outward anteriorly; sometimes the vagina drags the bladder out with it, forming a cystocele; posteriorly the rectum is drawn out, forming a rectocele; and when the walls of the vagina protrude entirely, the cul-de-sacs may also come down and bring with them some folds of the small intestine, forming an enterocele. The fall of the uterus is secondary then, as a rule, and it is produced by a sort of traction of the vagina on the os uteri : the utero-vaginal inser-

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tion falls, the os is hidden, and the womb descends little by little. At the same time, as a consecutive lesion, there is produced a supravaginal hypertrophy with an hypertrophic elongation of the vaginal cervix. This elongation of the cervix was studied by Huguier in 1860, and he contended that it was the common form of prolapsus, but we know now that this form is not very often found, and, when seen without an accompanying prolapse of the uterus, it can easily be diagnosed by touch, as the cul-de-sacs will be found very deep, and the uterine body in its normal situation is quite different from the vaginal prolapsus of the common order, where the vagina is turned down like the finger of a glove.

Prolapsus is accompanied by a certain number of complications, including versions and flexions of the uterus, metritis, and ulceration of the cervix. The vaginal mucous membrane that protrudes thickens and takes on the character of the skin, and the microbes have full play on the parts, which need prolonged disinfection when an operation is to be performed. Prolapsus brings about pain by drawing down the organ and by dysuria. Catheterism is useful, as it will show how much of a cavity you have, and what the degree of the hypertrophic elongation is ; if this last is very great, it will be well to diminish the length and weight of the organ before any anaplastic operation is performed :

an amputation of the inferior segment is usually the primary operation. The diagnosis from tumors is very easy, and yet the most curious errors have been made : the uterus has been taken for a polypus and for other tumors.

Prolapsus is called " external" or " internal," with reference to the relative position of the uterus to the vulva, and " complete" or " incomplete," when it is all prolapsed or only a part of it. This prolapse

Uterine prolapse.

may be of a normal organ or it may be of a uterus in which there is a neoplasm ; it may be caused by a weakening of the ligaments, by an insufficiency of the perineum, or result from both these causes.

Let me again say that the essential character of real prolapsus is the anatomical fact that the womb descends *en masse*, bringing with it the
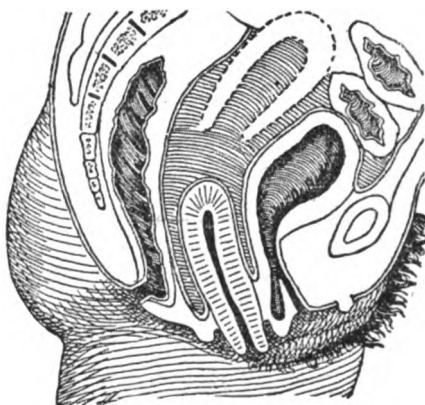
vaginal walls, which are turned inside out like a glove-finger; and, as it is in a wrong position, you should find it out of its usual place, or, rather, that its proper position is vacant; and when you reduce the prolapsus the cul-de-sacs resume their normal relations to the cervix. These characteristics distinguish the real hypertrophy of the cervix from the prolapsus.

Treatment.—Abdominal belts may be useful when they are nicely applied while the woman is lying down, after reduction of the prolapsus. Well-fitting belts sustain the small intestines and prevent their weighing down the uterus. Pessaries are of no service, because the vaginal walls are prolapsed, so that if you insist upon their use you will first of all have to repair the perineum.

You will find some women who will not allow any operation, and others who are so obese or so old that the chance of success in an operation is *nil;* in these cases the use of the hysterophore is advised, though its use is attended with indifferent success, I may say. It may be impossible to reduce the womb at once, and you will then have to resort to warm emollient baths and complete repose in bed; lately, uterine massage has been used to reduce the prolapse, and with success when done by good operators.

Surgical operations have two indications to fulfil: either to hold up the womb from below by supporting it by some plastic operation on the vagina, or else to "hang it up" by some suprapelvic operation. The methods of colpo-perineorrhaphy are excellent; the best, in my opinion, is Hegar's. It consists in making a triangular raw surface on the posterior wall of the vagina; the edges of the denuded area are brought together, and thus the lateral walls are brought close to each other, narrowing the vagina enough to hold up the uterus. Doléris gave a method of performing this operation which I have adopted. I make an incision in a transverse direction, about the level of the posterior commissure, then I take a dissecting-forceps, and, taking hold of the anterior lip of this incision, I tear off the mucous membrane with my finger from below upward; when I have reached a sufficient height I cut obliquely with the scissors on each side, making a triangular flap, which I take off; this having been done, the sutures are to be placed. The material to be used and the manner of placing the sutures have been much discussed, but are not of so much importance as authors would have us believe. I content myself with silkworm gut, and I simply put them in from below upward, without even trying to make any mathematical regularity. The important thing is to have the parts come as closely together as they can, and thus make the resulting nar-

rowing as great as possible. I leave the stitches in for two weeks; but it does not matter much if you forget one or more of them. If this operation is well performed and the dressings are properly attended to, union is prompt, and out of a great number of these operations I have never had one to fail; but what does happen is a relapse: in some women, no matter how successful the anaplastic operation may have been, the prolapsus will occur again. There are some women whose power of relaxation is quite indefinite, and seemingly has no limit. You have then, in such cases, the chance of doing Alexander's operation, or else abdominal hysteropexy; but neither of these operations, even when thoroughly performed, prevents the prolapse of the vaginal walls afterwards, so that the suprapubic operations are only an auxiliary, and are not complete operations in prolapsus.

In cases of rebellious cystocele it has been proposed to attach the bladder itself to the abdominal walls by the so-called *cystopexia*, but I think it is better in such cases to first do hysteropexy and then, if the bladder is still prolapsed, do colporrhaphy, and narrow once more the anterior walls of the vagina.

As to hysterectomy, of the vaginal order, as applied to certain cases of prolapsus, it is an easy operation, and I have done it several times with success; but remember that it also does not prevent the vaginal walls falling, so it should be considered only as a preliminary operation, and the vaginal operation must be performed afterwards, when the patient is sure of a permanent cure.

Ophthalmology.

CONJUNCTIVITIS, CATARRHAL, PURULENT, AND DIPHTHERITIC; ETIOLOGY AND TREATMENT.

BY THOMAS R. POOLEY, M.D.,

Professor of Ophthalmology in the New York Polyclinic; Surgeon-in-Chief, New Amsterdam Eye and Ear Hospital.

GENTLEMEN,—Cases of acute inflammation of the conjunctiva are very easily treated. If there be considerable secretion of a catarrhal character, the best of all treatment is with nitrate of silver, and I think many of these cases are prevented from becoming purulent by this treatment, just as beginning inflammation in the urethra is sometimes aborted in this way. The application is not necessarily a strong one, but should be of sufficient strength to cause hyperæmia. At first there is increase of secretion and swelling, but the subsequent contraction of the vessels arrests the process. I now make the application of the silver solution to this patient's lids in the manner I have already described. When you are going to make use of nitrate of silver for a long time, as in the more chronic forms of inflammation of the conjunctiva, you should avoid the staining of the conjunctival tissue, which, although it does not occur for a long time, is certain to take place sooner or later, and this discoloration is irremediable. It is ordinarily not very noticeable, but where it extends to the ocular conjunctiva it is very disfiguring. The use of cold in all these cases of conjunctival disease is beneficial, because it allays the irritation and smarting produced by the application of the nitrate of silver, and is also beneficial therapeutically. In acute cases which are not yet purulent, cold applications are beneficial in contracting the blood-vessels; and if you accept the microbic origin of all diseases, there is no doubt that cold is one of the best things for destroying bacilli. In all diseases of the conjunctiva we must, as in other conditions, endeavor to reach the cause. We recognize first hyperæmia, which precedes inflammation of every kind. This hyperæmia is noticeable in the conjunctival blood-vessels. It is more

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or less uncomfortable to the patient, but it is not accompanied by any secretion. It may be brought about by the environment of the patient, —bad air, crowding together, with the cooking done in the living-room or sleeping-room, or from the irritating nature of the atmosphere of certain manufactories. Tobacco-smoke, in my experience, is one of the worst forms of irritants to the eyes. I do not refer now to the irritation of the conjunctiva caused by poisoning with nicotine from excessive smoking, but that experienced by those who ride in smoking-cars or spend much time in public saloons.

In the approximately healthy eye, hyperæmia of the conjunctiva may be brought about by excessive work. If you examine the conjunctiva of one who has been using the ophthalmoscope or microscope very much, you will find redness of the conjunctiva, and this is accompanied by some discomfort. If this work be continued sufficiently long, there will also be hyperæmia of the optic disk. The symptoms of hyperæmia of the conjunctiva are : a sensation of a foreign body in the eye, in extreme cases slight photophobia, and often a sensation of itching. One of the most remarkable and philosophical papers I have read for a long time is one about the sensation of itching, written by Dr. Bronson, of this school, and published in the *Medical Record*, September 2, 1890. If you evert the conjunctiva, you find a fulness of the superficial conjunctival vessels and an undue redness of the lid, most pronounced in the reflection fold, with moderate swelling. Such a condition will soon be accompanied by a catarrhal secretion. The first thing you should do is to determine the refraction. Having corrected any error of refraction you must try to correct the patients' habits of life, and, above all, to make them go to bed early, and sleep, if possible, eight or ten hours. This last measure will often in itself bring about a cure. In addition, you may employ a simple lotion of boracic acid, or, if you prefer an astringent,—it should be mild,—a half-per-cent. solution of sulphate of zinc or of alum before there is any secretion. In every case you should turn up the upper lid and search diligently for a foreign body in the reflection fold. A conjunctivitis, even in both eyes, may be due to a foreign body. The measures indicated should be sufficient ordinarily to cure such a hyperæmia of the conjunctiva.

Passing now from hyperæmia to inflammation of the conjunctiva, we find that there is now decided swelling and a redness, which extends to the ocular conjunctiva. Most of the conjunctival diseases begin in the reflection fold, but here there is also ocular chemosis, due to an effusion of serum under the ocular conjunctiva which raises it from the sclerotic. This is especially noticeable where the eyes have been poul-

ticed. All these features may be observed in an ordinary acute catar-rhal conjunctivitis. You should make an application usually daily of a one-per-cent. solution of nitrate of silver. Your object should be at first to increase the passive hyperæmia and the secretion, in order to obtain the relief from the subsequent contraction. Common salt and water make a good lotion for the patient to use at home. In making cold applications the patient should be directed to place a single thick-ness of table-cloth or of a handkerchief on a piece of ice, and on this to lay compresses about the size of the lid. Before applying them all superfluous moisture should be squeezed out, because the leaking of the cold water about the eyes produces a slight eczema. These compresses are to be changed every few seconds, so that there is the constant effect of cold. If these be not changed very rapidly, you will have instead the alternate effect of heat and cold. In a large percentage of cases treated in this way, a cure will result in a few days. Ice-bags are too heavy for application to the eyes, and most of the cold coils which are applicable to other parts are not tolerated upon a sensitive organ like the eye, so that there is a field here for the exercise of ingenuity in devising a more satisfactory way of applying cold to the eyes.

Coming next to purulent conjunctivitis, we find that the severity of any attack of this kind depends directly upon the character of the exciting cause of the inflammation. In accordance with the patho-logical view that a catarrhal process may result in a purulent one, we have the least dangerous or idiopathic variety of purulent conjunctivitis. Very many ophthalmologists believe that there is no purulent inflam-mation of the conjunctiva without infection, but from a pathological stand-point this hardly seems reasonable, for we know that catarrhal processes elsewhere may become purulent. I think, then, we must admit that the purulent inflammation of the conjunctiva may be only one of the natural forms of the catarrhal process which has not been arrested. In addition to the symptoms already mentioned, there is a secretion of pus,—a blennorrhœa. Assuming the idiopathic origin, the danger is not necessarily great. There will be considerable swelling of the ocular conjunctiva, and, perhaps, also chemosis.

But if, instead of this moderate inflammation, the lids be so enor-mously swollen that they cannot be everted, and there is so much ocular chemosis that the cornea seems to be almost buried in this swelling, and there is a discharge of pus into the palpebral fissure whenever the lids are separated, we are confronted with the question, Is this a case of purulent inflammation due to infection of the eye with pus? It is, therefore, well to inquire carefully into the etiology of the condition,

and if the patient be a child, you should at once ascertain if it be not a case of ophthalmia neonatorum. The infection of the baby may have been from the vaginal secretions, not necessarily of a specific nature. In many cases where you can exclude both these sources of infection, the patient may, nevertheless, be infected by contamination with the secretions from others, by toilet articles, or in other ways. There is also what is called " auto-infection," from retention of the catarrhal secretion in the conjunctival cul-de-sac from want of cleanliness, and the infection may extend to the other eye.

The treatment of purulent conjunctivitis depends upon its severity, and your first and most important duty, both to yourself and to your patient, is to say that you cannot tell how grave the case is likely to be. The prognosis depends, of course, upon your ability to ascertain the cause, and if the cause be gonorrhœal, you must always look forward to the worst result. Should such a case be admitted to any hospital? I have had a number of gonorrhœal cases of ophthalmia at one time in my hospital, and have had the satisfaction of saving these eyes. Almost all of our hospitals refuse such cases, and this certainly is not right, for a few hours may be sufficient to cause the loss of the unfortunate patient's sight. To treat such cases properly there should be both a day and a night nurse, and the cold applications should be kept up in severe cases continuously day and night. The eyes should be cleansed every few minutes by wiping them out with absorbent cotton steeped in a solution of boracic acid, carbolic acid, or bichloride of suitable strength. At first I use bichloride, but as the eye improves this is not well borne, and I then substitute for it boracic acid. The attendants should be warned about the danger to themselves from contamination with the secretions. I have advised you to use nitrate of silver in the catarrhal form and in the mild blennorrhœas, but when you come to a case of gonorrhœal ophthalmia, I say most emphatically that you must not make applications of nitrate of silver to the conjunctiva in the inception of the disease. If you make such applications, in many instances you will aggravate the disease, and set up a diphtheritic type of inflammation. In the beginning, when there is much swelling and not much discharge, on touching the eye with nitrate of silver you will find that the lids become still harder and the discharge less, and if you can evert the lid you will see a true diphtheritic exudation. During the first week or ten days use nothing but cold applications and mild lotions ; but when you reach the stage in which the natural wrinkles and folds begin to appear in the lids, and where the discharge of pus is still more free, and you can evert the lids, then is the time to make

the applications of nitrate of silver. At this time your object should be to arrest the blennorrhœa, and this the nitrate of silver will do. Where there is much swelling of the lids, some ophthalmologists perform canthotomy, which consists in dividing the commissure; but I consider this bad practice, for it does not obviate the danger from pressure. The great danger from purulent ophthalmia is the destruction of the cornea, and the corneal complication comes either from the infection with pus or from shutting off of its nutrient supply. The latter I believe to be the correct explanation. When there is chemosis, the blood-vessels are strangulated, and, as a result, the vitality of the cornea is impaired, and it sloughs away very rapidly. Where the pressure only deprives a portion of the cornea of its nutriment, ulcers of greater or less size will develop. Such an ulcer will soon become infected with the purulent secretions of the eye.

CATARACT EXTRACTION.

BY EDWARD JACKSON, A.M., M.D.,

Professor of Diseases of the Eye in the Philadelphia Polyclinic; Surgeon to Wills
Eye Hospital.

GENTLEMEN,—Our patient to-day, Mrs. W., aged fifty, had the
left eye injured by a breastpin when seven years old, reducing her
vision to light-perception. For more than a year it had been entirely
sightless, and two months ago she came with hemorrhage in the an-
terior chamber and secondary glaucoma, for which I enucleated the
eyeball. It proved to be enlarged in all its diameters, especially
antero-posteriorly.

The right eye, she states, has always been near-sighted. With the
undilated pupil she counts fingers at four inches, and with the dilated
pupil makes out at one foot the letters visible to the normal eye at one
hundred and twenty feet. This globe, also, is greatly elongated.
The lens presents a brown opacity of the nucleus, with red fundus
reflex in the periphery of the dilated pupil. The vision has been
failing very gradually, and the eye was said to have cataract five
years ago. She is now practically blind, yet probably many years
would have to elapse before the cataract would become entirely
mature.

The case is not one especially suited to a ripening operation, because
the apparently large, hard nucleus would indicate a special danger from
swelling after any operation for artificial maturation. It is a case
where either an immature cataract must be extracted or the patient
allowed to remain practically blind for years, perhaps for the remainder
of her life.

As I have warned her, it is probable that I shall be unable to re-
move all of the clear cortical substance, and that after the operation
improvement of vision will not follow until this has been absorbed, or

until the division of the capsule and the remaining cortex, some weeks hence, furnishes a clear pupil.

This alternative is so much better than the indefinite waiting for the ripening of the lens, that she has not hesitated to accept it.

Preparation of the Patient.—She has been in the hospital for two days, during which time the eye has been carefully washed with a boric-acid solution twice daily, and the lids have been recently washed with a solution of mercuric chloride one to five thousand. Sometimes we keep the eye to be operated upon bandaged for twelve or twenty-four hours previous to the operation. However, I do not regard this as essential, and have allowed this patient what use she has of her only eye up to the time of operation. An hour ago I had a single drop of the four-per-cent. solution of cocaine instilled, not to produce anæs-thesia, but to dilate the pupil. For this purpose cocaine is superior to other mydriatics, because under it, when the aqueous humor escapes, less contraction of the pupil occurs.

Within the last ten minutes two instillations of the same solution of cocaine have been made to secure anæsthesia, and now, as the final step, the conjunctiva is again washed with boric-acid solution. In this preliminary cleansing of the eye it is especially important to see that no possible infective material remains upon the lashes or edge of the lid, because sometimes, after the completion of the operation and the removal of the speculum, the patient will nip the lids together and roll the eye up, and the whole margin of the upper lid with its lashes will slip neatly into the corneal incision and come in contact with the raw surface of the corneal flap.

Operation.—Having introduced the speculum, standing at the head of the operating-table on which the patient is lying, I take the cataract-knife in my right hand (it being the right eye, for the left I would take it in the left hand), and the fixation forceps in the left. The instruments that I use have already been disinfected by placing in boiling water; but, to guard the point and edge of the knife against accident, I have kept it in my own hand, and now, as the last preparation, I dip it into boiling-hot water. With the fixation forceps the conjunctiva is now seized at the nasal margin of the cornea just below the horizontal meridian. As this lens is probably above the average in size, to get a sufficiently large incision I make the puncture just above the horizontal meridian, and one-half millimetre inside of the temporal margin of the clear cornea, and the counterpuncture (Fig. 1) in a corresponding position within the nasal margin of the cornea. I push the knife steadily forward until more than one-half of the incision is completed

and its cutting edge has passed from the periphery of the anterior chamber, so that the iris can no longer fall in front of it (Fig. 2). The remaining bridge of tissue is then divided as I draw the knife back (Fig. 3).

Opening the Capsule.—The next step, the opening of the capsule, is also done with the knife, which is now introduced with its back in the incision, and withdrawn from heel to point through the incision from the nasal to the temporal side until the point reaches the temporal margin of the pupil. Then the point is slightly depressed and made to enter the capsule, and the knife is carried forward until the point passes behind the upper nasal pupillary margin. This makes an incision in the lens capsule parallel to the corneal incision. The knife is then withdrawn and laid aside. The cutting is done, and, as the incision of the cornea is quite painless under cocaine, and that of the lens painless under any circumstances, the operation so far has caused the patient no discomfort. The pressure necessary to expel the lens commonly is unpleasant, but not excessively so; very few patients fail to bear it with steadiness.

Delivery of the Lens.—To effect this the tortoise-shell lens-scoop is taken in the right hand and pressed on the lower portion of the cornea, so that the lower margin of the lens is tilted back, and the pressure made on the contents of the globe forces the upper lens-margin forward until it stretches the pupil and presents in the corneal wound. The upper lip of the corneal wound is at the same time depressed by pressure with a corneal spatula held in the left hand. As the pressure increases the pupil is dilated and is forced more into the corneal wound, presenting the free edge of the lens, or of the firm portions of the lens, if the cortex be soft. When the large nucleus presents in the corneal wound, by steadily maintaining the pressure it gradually advances until the thickest part has passed outside of the eye. I do not, however, at once relax this pressure, preferring to compel as much of the cortex as possible to follow the nucleus, causing as much as I intend to extract by pressure to come away at this time. The relation of the opening in the capsule and the corneal opening and the stretching and pushing aside of the iris now offer a freer avenue of escape for the cortex than there will be when the iris has returned towards its normal position and the pupil contracted again, as will happen when the pressure is removed.

Considerable slightly hazy cortex has come away, but I have little doubt that some still remains adherent to the capsule.

Washing out the Anterior Chamber.—The final step in the operation

under such circumstances is the washing out of such cortex as can be thus removed by means of a Lippincott syringe. I do this less with the hope of removing all cortex from within the capsule than for the purpose of thoroughly clearing the anterior chamber of it; for cortex within the capsule, although it may take a considerable time to disappear, and may even necessitate a secondary operation, is quite harmless as far as the prompt and satisfactory healing of the eye is concerned.

This washing of the eye having been completed, you will notice that the pupil is central and has fully contracted; the iris is in the normal position.

The After-Dressing.—The eye is now dressed by placing upon it a few squares of antiseptic gauze, and over this a little absorbent cotton to receive the discharge, which is usually quite considerable in the first few hours after the operation. This dressing is held in place by two strips of adhesive plaster extending from the brow to the cheek and from the brow to the nose. If the patient had another eye, and especially if it had any power of vision, I would close it in the same way, to secure the rest of the eye operated upon from all associated movements. The advantage of this sort of dressing over any form of bandage is that it is entirely unaffected by movements of the patient's head upon the pillow, which by drawing on the turns beneath the head cause some change of tension or displacement in any bandage or other dressing fastened around the head, unless such dressing is applied so tightly as to make pressure.

To my mind the most important indication as to the dressing after cataract extraction is for the absolute avoidance of external pressure upon the globe.

This dressing will be changed to-morrow morning, and after that morning and evening, or perhaps only in the evening, to allow of the washing of the lids that is necessary to keep them most comfortable, and so to prevent any tendency on the part of the patient to disturb them.

If the anterior chamber closes promptly, all dressings will be omitted at the end of five or six days, and the eye simply covered with a shade or dark glasses. This patient will for two or three days be kept in bed. Older patients, especially if fleshy, I sometimes allow to sit up from the first. Rest of the body is of value chiefly as it aids in securing rest of the eye, and enforced stillness will with some patients rather tend to defeat the purpose we have in view.

SPECIAL POINTS IN THE OPERATION.

The Knife.—The knife that I employed here is one that I have used habitually for several years, and have described in the *Transactions of the American Ophthalmological Society* for 1888, p. 62, and in the *American Journal of the Medical Sciences*, March, 1889, p. 262. Its blade consists essentially of two parts, the point resembling that of a Graefe

FIG. 1.
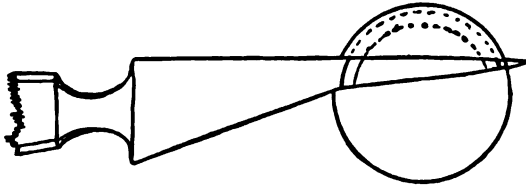
Introduction of the cataract knife through anterior chamber.

knife, narrow and sharp, between eleven and twelve millimetres in length (just long enough to go across the anterior chamber), which enables the operator to have the same control over the puncture and counterpuncture as with the Graefe knife; and the second part, fourteen millimetres in length, which spreads like a Beer knife to a maximum width of seven millimetres where it joins the handle.

The puncture and counterpuncture are made as with the Graefe knife, care being taken to have the plane of the blade correspond with that of the intended incision. After the puncture and counterpuncture have been made, the knife is thrust steadily forward, the broadened blade causing it to continue the incision until its cutting edge lies tan-

FIG. 2.
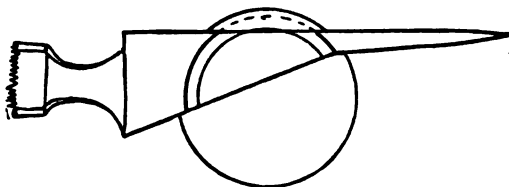
Direct thrust of knife after primary incision.

gent to the inner surface of the cornea (Fig. 2) and the incision has been more than half completed. The forward thrust is still continued until the whole length of the blade has been utilized, and the tissue still to be cut is comparatively narrow (Fig. 3). The bridge of tissue remaining is then divided as the knife is withdrawn.

This dividing of the remaining bridge of corneal tissue during the withdrawal of the knife is advisable, whatever knife is used. In beginning an incision the cutting edge of the knife is approximately perpendicular to the part of the cornea that it has to divide, so that the cutting is done upon two parts of the blade, each but little longer than the thickness of the membrane (Fig. 1), and with a very oblique forward thrust. At the completion of the incision, however, a much

FIG. 8.
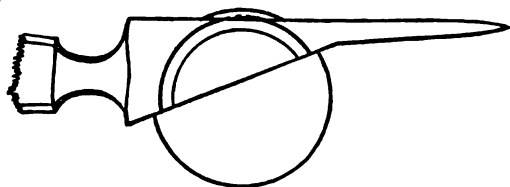
Incision for cataract extraction almost completed.

greater portion of the blade is engaged in cutting the correspondingly wide part of the cornea that remains after the edge of the knife has gotten to the margin of the anterior chamber; and to divide this by a continued forward push is likely to cause the eye to rotate upward and the knife to escape with a jerk.

The change in direction of the movement of the knife from thrusting it forward to withdrawing it is liable, unless the patient's eye and the operator's hand are perfectly steady, to cause a bend or angle in the corneal incision. With the Graefe knife these angles may be placed symmetrically as regards the centre of the incision. With my knife they fall rather toward the side of the counterpuncture, making the appearance less symmetrical.

The chief advantages of this knife are two : first, the back makes counterpressure against the angles of the incision, which just balances the pressure of the cutting edge, and prevents any tendency to upward or downward rotation of the eyeball, rendering much easier the fixation of the eye. Second, if the eyeball is kept in proper position and the knife thrust directly and steadily forward, no aqueous humor escapes until the edge of the knife has passed to the margin of the anterior chamber, where it would be impossible for the iris to become entangled on it. This retention of the aqueous is a decided aid towards getting a smooth, regular incision.

The Opening of the Capsule.—This I do with the point of the knife, because it simplifies the operation by disposing of an instrument, and one that is particularly difficult to keep aseptic,—the cystotome. Of all

instruments that are introduced within the eye during a cataract extraction, to come in contact with tissue that is to remain after the operation is completed, the cystotome is the most difficult to keep aseptic. It has a shoulder which is liable to retain infective materials, and which is difficult to clean without dulling the keen edge of the instrument. I have not tried Gruening's suggestion of a platinum cystotome that can be disinfected in the flame of an alcohol lamp. If such an instrument can be kept sufficiently sharp, I have no doubt it can be made quite aseptic.

When I first began to do extractions without iridectomy, I feared that the contraction of the pupil following the escape of the aqueous humor would prevent the making of a sufficient opening in the capsule with the point of the knife, and therefore resorted to the old manœuvre of opening the capsule with the point of the knife before making the counterpuncture. Experience has shown, however, that this is quite unnecessary, as even after the contraction of the pupil the incision that can be made in the capsule, either by its stretching or by its extending under the pressure of the lens, is quite sufficient to allow the escape of the largest lens without embarrassment, and the change of the direction of the knife necessary to open the capsule while the anterior chamber yet retains its depth is so great as to interfere seriously with the smoothness of the corneal incision.

One further point with reference to the expulsion of the lens. It is of the greatest importance after this has been started, and sufficient pressure made upon the lower part of the cornea, to somewhat displace the lens, that such pressure shall not be relaxed until the thickest part of the lens has escaped from the corneal wound. Any alternate increase and diminution of the pressure tends to displace the lens from its normal and advantageous position without expelling it from the eye, and is therefore extremely dangerous.

I also prefer, after the escape of the nucleus, to keep up the pressure on the eyeball, with some little movement of the lens-scoop by which it is made, until all of the cortex has been forced out, that I hope to expel in this way, preferring not to allow the parts to resume their normal relation, and then to displace them again so far as would be necessary for the expulsion of additional cortex.

PHLYCTÆNULAR OPHTHALMIA.

BY HENRY DICKSON BRUNS, M.D.,

Professor of Diseases of the Eye.

GENTLEMEN,—Following the plan I have indicated as the one which I always pursue, I propose to show you to-day a very common form of disease of the eye, and one which you are sure to meet with very frequently in your future practice. I shall also give you my views in a very unvarnished form, leaving you to find out from the multitudinous text-books what other people may think of the subject. You see this little child, about three years old, brought in here by its mother; you are immediately struck by the fact that it appears to have lost its eyesight completely, and to be unable to guide itself about, as it clings to the skirts of its mother and even tries to hide its head in the folds of her gown. Now, I feel quite sure, from past experience, that we have not a case of blindness here, or, indeed, of any very serious condition of the eye. Look well at the general appearance of this child; notice its fair hair and its white, delicate skin; see its somewhat thick lips, and note the little excoriations on the upper lip, immediately below the nostrils; pay attention to a slight glandular swelling on one side of the neck. This is what we call the scrofulous type.

You see that it is perfectly impossible for me to open this child's eyes, so tightly are the lids clinched, the tears even being squeezed drop by drop through the narrow palpebral fissure. I am obliged to have the mother take the child upon her lap and put its head between my knees, as I sit here in a good light, and then, with these small retractors, I tear open the lids forcibly, only to find the eyeball drawn up as high as the superior rectus can pull it. This condition is what we know as photophobia, from the two Greek words meaning dread of light. And now that the superior rectus has become tired out before my fingers, and the eyeball is slowly rolling down again so as to

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expose the cornea and conjunctiva in its immediate neighborhood, I can show you the cause. On the cornea, not far from its centre, you see a little white pimple, and upon its margin or limbus you see two other little pimples of the same sort. These are known as phlyctænulæ. You see they are accompanied by a pretty severe, coarse injection of the conjunctiva, and if I evert the lids you will see that the conjunctiva on their inner surfaces is thick, soft, and very red. In the immediate neighborhood of the phlyctænulæ you perceive, also, that the injection is greatest; in fact, running towards each pimple is a little triangular tongue or finger of congested vessels pointing, as it were, to the seat of all the trouble. Even the usually nonvascular surface of the cornea is marked by one or two new-formed vessels straggling over it and ending at the phlyctænulæ.

This, then, is a very typical example of an extremely common disease of childhood, and my object in calling your attention to the general appearance of the child was to emphasize that it is particularly a disease of scrofulous childhood.

Whatever may be the true cause of that condition which we term scrofulous, whether it be an indication of a tubercular diathesis or of a more or less remote syphilitic taint, the ear-marks are well known, and to the careful observer very striking. It is almost needless to say, however, that they are very variable. Sometimes these children appear to be in the very bloom of health. They are fat and rosy; but it is very seldom that a careful examination will not reveal some other indication of the condition besides these phlyctænulæ upon the eye, though, in my opinion, they alone are sufficient to give a good title to the unhappy possession of the scrofulous habit. It was Horner who first pointed out that these affections of the eye are closely akin to, and often accompanied by, eczema; and here, as in all diseases, we must constantly bear in mind the all-illuminating facts of embryology if we wish to be masters of the situation. Embryologically the conjunctiva and corneal epithelium and the skin are one and the same. The minute anatomy of this affection has, of course, been very little studied, because opportunities have been few and far between, it seldom chancing that death occurs while phlyctænulæ are in full bloom on the cornea or conjunctiva. However, whether the pimple be on one or the other, it consists of nothing more than a collection of leucocytes, determined, in a scrofulous person, to some particular point by an irritation, doubtless of a very trifling nature. Here it is interesting to remember the labors of Formad upon the lymphatic system of rabbits and guinea-pigs, and the deductions he drew, that the anatomical de-

ficiencies of this system probably have a great deal to do in producing those conditions which we know as tuberculosis and scrofula. In other words, in one of these children with an imperfectly developed and functionally poor lymphatic system a very slight irritation produces an excessive diapedesis, resulting in a pimple, composed, as I have said, of poured-out leucocytes, and these, having a low vitality and being closely crowded together, cannot readily maintain themselves, but soon die and undergo fatty degeneration, forming pus. When this takes place the little covering of epithelium over the top of the phlyc- tænulæ gives way. We have a minute quantity of pus evacuated, and a small, bluish-white or yellowish-white ulcer remains. Now, if this process has taken place upon the conjunctiva, the resulting disturbance is very slight; the eye is red and watery, and by reason of the injec- tion in its immediate neighborhood it is easy enough to observe the phlyctænulæ and understand the cause of the trouble; but if the process has its seat in the anterior portion of the cornea, the nerves of which have acquired an exquisite degree of sensibility, even light act- ing upon them as an irritant when they are in a diseased and abnormal condition, it will have all the violent symptoms of extreme dread of light, to which I drew attention when the child first came in. I might digress a moment to say that this extreme sensitiveness of the corneal nerves is, of course, due to the process of evolution and natural selec- tion. The cornea, as you know, is a non-vascular tissue, possessing, therefore, a very critical nutrition, slight irritants affecting it gravely and leading to serious inflammations. It is highly beneficial, there- fore, that it should possess a nervous supply of great irritability, so that the moment an irritant, no matter how slight, is applied to its surface it may be resented, the eyelids may be rapidly blinked and tears copiously poured out, that the offending body shall be removed. One may see how important this is in certain cases which I hope to show you later on, where a paralysis of the facial nerve prevents closure of the eyelids or of the fifth blunts the sensibility of the cornea, and the ingenuity of the oculist is taxed to prevent ulceration of the cornea because these little irritants are not immediately and successfully removed.

To return now to our phlyctænulæ. What I particularly wish to call your attention to is that, living here in the South, we have an oppor- tunity to observe and treat forms of this disease far more severe than any I have seen in the clinics of the North. These forms are to be found in the eyes of our large population of negro or mixed blood. The negro, and perhaps especially the mulatto, is eminently scrofulous, and you

will have occasion to see before this course is over many cases of negro
and mulatto children, and I may say even of adults, whose eyes have
been practically destroyed by repeated outcrops of phlyctænulæ. We
find in such cases the whole cornea covered with small round nebulæ,
the scars of former phlyctænulæ. The vascularity which these phlyc-
tænulæ induce and the loss of substance which they cause, give a
slight general cloudiness to the whole cornea and mark it with in-
numerable small facets, so that the victims of this unfortunate condi-
tion are reduced to little more than a bare perception of light. In
these cases we see the phlyctænulæ occurring in concrete masses in the
neighborhood of the cornea and impinging slightly upon its surface.
These present themselves as slight elevations of a rosy or purplish color,
and may have an extent of a quarter of an inch in length by almost the
same measure in breadth, and when slightly developed they sometimes
must be scrutinized quite closely to distinguish them from a condition
known as episcleritis, a disease, however, quite rare as far as my ex-
perience goes in our climate. These phlyctænulæ *en plaque*, as I have
been accustomed to term them, for want of a better name, go through
the same processes of ulceration as the small, discrete ones do, though
it seems to me the ulceration is seldom as deep as in the case of the
discrete phlyctænulæ, and I have never seen it involve the cornea to
any considerable extent. Occasionally, though, its singular and un-
usual appearance is added to by the collection of pigment in its imme-
diate neighborhood, so that with the injection, the yellowish hue due to
the superficial ulceration of the plaque, and the black pigment blotches,
the immediate neighborhood of the cornea presents a most piebald
appearance.

It has seemed to me that this affection follows the negro and
mulatto much further through life than the Caucasian. I am under
the impression that I have seen many more negroes and mulattoes with
phlyctænular disease than I have seen white people so afflicted, and if
you will turn to my report of this clinic for the last year you will find
that of all negroes afflicted with diseases of the cornea more than
twenty-four per cent. were cases of phlyctænular disease.

A word, now, as to the treatment of this condition. My view is
that it consists, in the words of "Colonel Sellers" slightly modified, in
mercury, "externally, internally, and eternally." I have assured
myself that atropine, which is very commonly used in the treatment
as a matter of routine, has no effect in abbreviating the course of the
disease; whether one uses atropine or does not, the duration of the
treatment, on an average, is the same. It should be reserved for those

cases in which the severe irritation of the cornea brings about symptoms of iritis. Of other remedies which you will see mentioned in the text-books, I have had little experience,—that is to say, little experience in a form which will enable me to say positively that they are valuable or absolutely useless, except that I may mention that occasional trials have not tempted me to exploit them further. Bathing the closed eyes with very hot water is, however, often extremely soothing, and seems to have some favorable result; but mercury is our sheet-anchor, and no one who has used it even a few times in this condition will ever doubt that he is in possession of a drug which exerts a decided influence. It is used either in the form of calomel, carefully washed and in a fine powder, of which a little is dusted into the eye from a camel's-hair brush, while it is held widely open, or in the form of the well-known Pagenstecher's ointment, made by rubbing up the yellow oxide of mercury very thoroughly with vaseline, or, what is preferable, because it is much easier to introduce within the lids, albolene, in the proportion usually of two grains to the drachm. This is used by introducing a small portion, about the size of the head of a large white pin, inside of the lids, as you see me do now by pulling down the lower lid and wiping a small quantity of the ointment off upon the inside of the lid, or between it and the eyeball, and then diffusing it over the globe by a gentle rubbing with the finger.

I have the histories of thirty-eight cases of phlyctænular conjunctivitis, nineteen of which were treated with calomel and nineteen with the yellow ointment, during the past year. The average duration of the cases treated with calomel was twenty-nine days, while the average duration of those treated with the ointment was twenty-eight days. You see, therefore, that there is little to choose between the two. I find, however, that in the sluggish cases, where there is but little vascularity and the irritation is not extreme, calomel, which is easy to apply, is satisfactory, while I use the yellow ointment in the cases where the irritation is greater. Internally I never fail to put the patient upon minute doses of bichloride of mercury, continued for a great length of time. By a minute dose I mean the fortieth or the thirty-sixth of a grain, repeated once or twice a day.

I have already pointed out to you that many of these children are in very good flesh, and many of them are rosy and far from anæmic. I do not believe in drugging such children with syrup of the iodide of iron and cod-liver oil. Indeed, even in those that are pale and thin, experience has taught me that a little bichloride of mercury will produce far more beneficial results than the classical and too often

purely routine treatment with so-called ferruginous tonics, cod-liver oil, etc. I believe that in the scrofulous subject, the difficulty does not lie in constructive nutrition ; digestion, assimilation, and tissue-building are often going on fairly enough. The trouble with these people is that retrograde metamorphosis and the carrying away by the lymphatics of its results are extremely tardy and ill-performed. What we need is the introduction into their blood and juices of a chemical which, when supplied to the cells, aids in bringing about the death and destruction of the elderly, decrepid cells that are occupying the places that should be filled by a young, vigorous, and energetic generation. Such a drug we have in mercury, and I can promise you that, if you will put these little people upon small doses continued for a goodly period of time, you will have the satisfaction of seeing the thin and pale ones grow stout and rosy, and the fat and flabby ones assume a state of health and vigor that they never had before, and this when a long course of iron has failed to relieve, and syrup of the iodide, phosphites, and cod-liver oil have kept them in a constant state of nausea accompanied with loss of appetite.

This action of the bichloride of mercury is no discovery of mine. I wish it were. It has actually been demonstrated with the microscope that a prolonged course of very minute doses will increase the number of the red blood-corpuscles. This it does, doubtless, in the way I have indicated, by destroying the old, and so making place for the young and new. But a long clinical experience with the scrofulous has convinced me of the truth of this observation, and I can commend it more unhesitatingly, perhaps, than I can the use of any single drug in any other single condition of disease.

𝔏𝔞𝔯𝔶𝔫𝔤𝔬𝔩𝔬𝔤𝔶, ℌ𝔥𝔞𝔯𝔶𝔫𝔤𝔬𝔩𝔬𝔤𝔶, 𝔑𝔥𝔦𝔫𝔬𝔩𝔬𝔤𝔶, 𝔞𝔫𝔡 ℭ𝔱𝔬𝔩𝔬𝔤𝔶.

MASTOIDITIS FOLLOWING TYPHOID FEVER; MASTOIDITIS WITH FATAL SEPTICÆMIA; DOUBLE MASTOIDITIS AND DOUBLE MASTOID OPERATION, WITH RECOVERY.

CLINICAL LECTURE DELIVERED AT THE BOSTON CITY HOSPITAL.

BY J. ORNE GREEN, M.D.,
Clinical Professor of Otology in Harvard University.

GENTLEMEN,—The two cases to which I ask your attention to-day are excellent illustrations of the more serious aural diseases which some-times accompany typhoid fever, and also demonstrate the symptoms, dangers, and treatment of mastoiditis.

The first case is one of purulent inflammation of both tympana accompanying typhoid, which resulted in a mastoiditis of one side from which the general system became infected, and the patient died from a general infective septicæmia.

H. C. entered the Massachusetts General Hospital on January 26, 1894, with a well-marked case of typhoid fever, which proved to be of a very severe type. The temperature ran from 103° F. to 105° F.; there was much carphology and great and constant subsultus, with a small and dicrotic pulse; the mouth and tongue were in a very bad state, in spite of extreme cleanliness; but he took liquids well, and occasionally minced meat and soft puddings.

On February 15 the pulse fell for the first time, but on the 18th he complained of pain in the left ear, and the next day there was a sero-purulent discharge from it, with marked tenderness of the tip of the mastoid; there was also suppuration beneath the nail of the right index finger. I saw him at this time and found purulent inflammation of the left tympanum, with a large crescent-shaped perforation in the posterior half of the drum-membrane, and decided tenderness of the mastoid tip. There was slight congestion of the manubrial plexus on the right side also, with a yellowish opacity on the posterior lower quadrant, sug-gestive of a little opaque serum in the cavity; but no pain, fulness, or

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deafness on that side.   The left ear was kept cleansed by hot corrosive douching three times a day.   Nothing was done to the right ear, and two days after all abnormal appearances had disappeared from this ear, and the left was free from pain, and the mastoid tenderness had nearly disappeared.   On the 24th, however, there was severe pain in the right ear, and examination within a few hours showed the drum-membrane intensely congested and bulging from purulent serum, with great sensitiveness of the mastoid tip.   The general condition was worse.   An immediate paracentesis was done, and hot antiseptic douching every two hours was begun.   On the 27th the whole right mastoid was sensitive to pressure ; both ears were discharging freely.   March 1 he was much worse, and a small spot of bronchial breathing, with râles, was found in the right lower posterior region.   On March 3 he began to show a slight yellow tinge of the skin, complained of " feeling sick" without any definite pain till afternoon, when he complained of pain in the left carpus, which within a few hours became red, swollen, and very tender. From this time he failed rapidly.   On the 8th the left knee became red, swollen, and fluctuating ; the right knee and left hip were also slightly swollen.   On the 10th he died.

The autopsy, by Dr. W. F. Whitney, showed typhoid ulcers in the healing stage, acute hyperplasia of the spleen, granular degeneration of the kidneys, cheesy bronchitis, and fibrous peribronchitis.

A bacteriological examination from the innermost part of the right ear on February 28, by Mr. Hughes, the house officer, gave a *pure culture of the staphylococcus pyogenes albus ;* a similar examination of the blood on March 4 *gave identical results, and at the autopsy the same microbe was found by Dr. Whitney in the blood of the heart, and in cultures from the spleen and liver.*

A dissection of the right temporal bone by myself showed pus in the tympanum, a small oval perforation of the drum-membrane, the ossicles in position, and the tympanic mucous membrane red and moderately swollen.   The mastoid in its upper half was largely diploëtic, in its lower part pneumatic, and *filled with thick pus throughout.* There was a minute carious perforation of the mastoid into the sigmoid groove, and *corresponding with this, within the lateral sinus, was a small purulent deposit.*   There was an extreme outward curvature of the upper portion of the sigmoid groove which lay directly against the outer table of the skull.   The specimen is shown here.   There was also a carious spot one-eighth of an inch in length in the groove of the superior petrosal sinus, about a quarter of an inch in front of the sigmoid groove.

We have here a well-marked example of a staphylococcus infection of the tympana following typhoid fever, and the same infection of the general system in all probability taking place through the lateral sinus from the right mastoid.

The diagnosis of the tympanic disease was readily made: pain in the ear, to which the patient called attention, and inspection then showed on the left side a perforation of the drum-membrane already of considerable size, with purulent secretion coming through it; on the right side an inflamed and bulging drum-membrane in which a paracentesis immediately evacuated a purulent secretion, which proved to be already infected with the staphylococcus. The involvement of the mastoids was shown by the sensitiveness of the bone on pressure : on the left side this readily subsided under hot antiseptic douching; on the right, in spite of the same treatment, together with ice to the bone, it increased, and the disease of this mastoid was almost certainly the cause of the fatal septicæmia. In addition to these results of the physical examination, we have as an aid in diagnosis the temperature chart, which, as you see, shows sharp rises for the acute stages of the ear-disease, in themselves enough to make you suspect some complication which the physical examination reveals in the ears, and for which it fails to find any other cause, such as a relapse of the typhoid, for there were no fresh rose-spots, and the subsequent temperatures were not typhoidal.

The relapse in the right ear is especially worthy of notice, and shows how guarded we must be for a week or more in deciding that an inflammation of the tympanum has wholly subsided. On the 19th the right showed distinct congestion and infiltration of the drum-membrane, which entirely disappeared in two days, but three days after recurred with great intensity, the tympanic secretion of the first attack probably becoming infected by the staphylococcus. Exactly the same thing occurred in the next case, to which I shall ask your attention ; but it by no means necessarily happens even in very severe infective diseases, for I have just had a severe case of scarlet fever, in which the left ear required paracentesis, and the right was painful and distinctly congested ; the left went through a prolonged suppuration, but the right was well in two days without suppuration, and has so remained.

The time when the general system was first infected is an important consideration. Before this took place there is every reason, clinical and pathological, to think that a thorough opening and cleansing of the right mastoid would have prevented the general infection and saved the patient's life, for the presence of staphylococcus in the tympanum and mastoid very early in the disease, the carious perforation into the

CHART I.
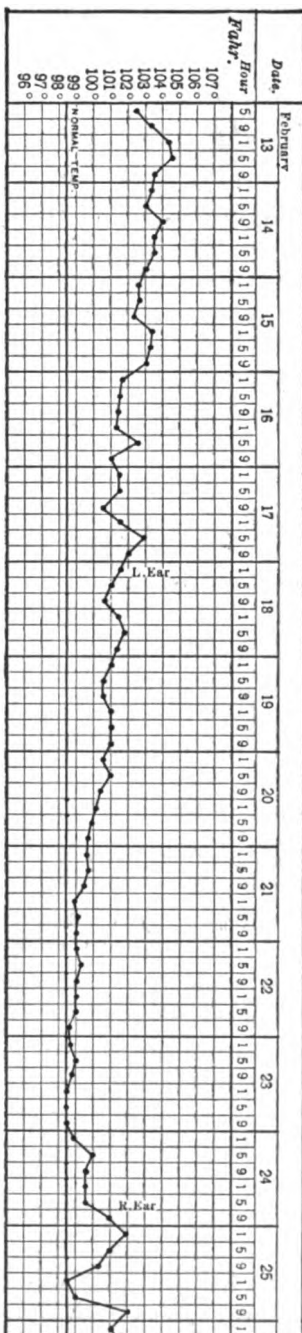
CHART II.
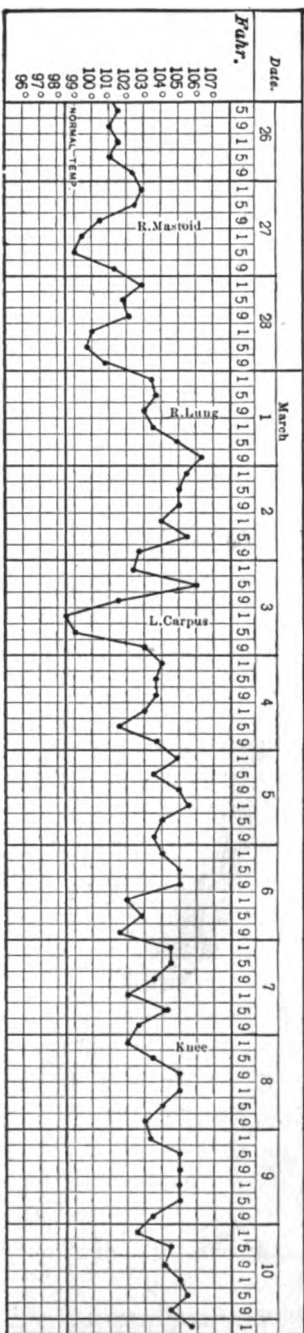
lateral sinus from the mastoid afterwards, the purulent collection within the lateral sinus, presumably staphylococci, and the existence of staphylococci in the blood and almost all the internal organs, furnished a chain of evidence pointing directly to the tympanum as the original focus of infection.

Two days after the right ear was diseased the mastoid on that side was certainly seriously inflamed, and two days after that the peribronchitis was discovered, and two days later the inflammation of the left carpus, the latter a certain symptom of the general infection. It is probable that the lung-disease marks the general infection, and this showed itself on the fourth day after the paracentesis, an unusually short time, but to be explained by the very thin inner cortex of the mastoid which allowed an early penetration of the septic material to the inside of the cranium. I think an operation on the mastoid on the 27th or 28th, or as soon as it was evident that a distinct purulent mastoiditis had developed, would have saved the patient. My rule with mastoiditis has been to allow a week or ten days for the inflammation to subside under antiphlogistic measures, leeches, ice, and hot douching of the meatus, before operating, unless symptoms in the general condition become urgent, when I operate immediately. In this case the favorable time for the operation was lost, the general infection occurring unusually early.

Would an operation later have been of any use? Bacteriology teaches us that the microbes once in the blood multiply there, and no removal of the original focus of infection will then prevent this multiplication in the blood. Clinical experience shows us, however, that cases of mild septicæmia do recover, and we cannot define what limits nature has for successfully disposing of the blood-infection. If there are such limits, a continuous reinfection from the original focus must operate very unfavorably, and, therefore, it seems to me the removal of this focus is highly desirable, if it can be accomplished.

In this particular case the question of operation was considered at a consultation with two of my colleagues, on March 3, and abandoned on account of the apparent extremely weak condition of the patient; but the fact that he had strength enough to live for another week in a state of severe septicæmia seems to show that there was a greater reserve of vitality than was appreciated. I regret now that the operation was not done even at that late date.

In connection with the preceding case, an exactly similar one without septicæmia was under treatment at the same time.

J. M., thirty-five years old, entered the Massachusetts General Hos-

pital in the wards of Professor F. C. Shattuck, on February 6, 1894, with typhoid of moderate severity and of three weeks' duration. On the 26th there was pain in the left ear, the drum-membrane was reddened, infiltrated, but not bulging, and the mastoid was very sensitive to pressure. An immediate paracentesis evacuated a sero-purulent fluid. On March 8 the temperature showed a decided rise, which, however, immediately fell; but two days after the rise recurred and continued. The ear did not improve; the discharge continued abundant and purulent, and there was greater infiltration of the drum-membrane with increasing tenderness of the mastoid, although no external œdema existed. No other cause than the ear could be found for the temperature, and on March 16 the usual mastoid operation was done. The external cortex presented the bluish appearance of inflamed bone; the interior of the bone was largely diploëtic, soft, and cheesy, and in a state of suppuration. It was thoroughly cleaned out with the curette. On March 18 there was a sudden congestion of the right tympanum with pain and a hemorrhagic bleb filling the deeper meatus, which was punctured. Two days after the right drum-membrane was bulging, and the right mastoid was sensitive on its posterior aspect and tip. A paracentesis was done and a culture taken from the first drop of secretion showing a streptococcus infection. A Leiter ice-coil to the mastoid and frequent hot antiseptic douching of the meatus were used. The temperature during the attack of the second ear was not raised, and continued about normal throughout the disease,—98° F. to 99° F. The inflammation of the typanum and marked tenderness of the mastoid remained without improvement, and on April 4, a mastoid operation was done on the right side. The condition of the bone was the same as on the left side, diploëtic instead of pneumatic, softened, and suppurating, and cultures made from the diploë showed abundant streptococci.

In removing the softened and suppurating diploë it was found that the inner table was softened also, and this was removed over a space one-third of an inch long, thus exposing the lateral sinus. The dura was free from all signs of inflammation. That evening the temperature rose to 100.5° F., but fell immediately to normal and so remained. Convalescence was uninterrupted, and on April 15 the left ear was healed, and on May 2 the right also. He was discharged well on May 9.

In considering this second case, note the high temperature as the left ear became inflamed, the fall when the secretion was thoroughly established, and the rise again as the mastoid on that side became in-

volved. Compare this with the chart for the right ear, where we had a slight rise for two days, then a normal temperature throughout, notwithstanding the suppurating mastoid on that side also. I have already often called attention to this variability in the temperature which we cannot explain. In one case we have a distinct rise, as here with the left ear, and in another case no elevation, as is seen here with the right ear, and yet, as far as I could judge, the conditions were exactly the same. A rise in temperature is an aid in diagnosis, but the absence of a rise by no means excludes mastoiditis.

CHART III.
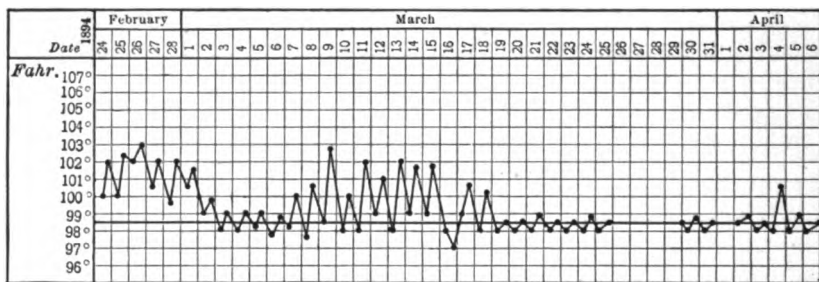
The operation on the right mastoid was undertaken on account of the increasing sensitiveness of the bone to pressure and the obstinate infiltration of the drum-membrane, which did not improve under treatment. The condition of the interior of the bone not only justified the operation, but showed that its performance was an imperative surgical duty, for the inner table was already so softened that in a short time it must have broken down, and would then have exposed the lateral sinus and dura exactly as occurred in the first case, with a fatal result. The very favorable course of the disease, notwithstanding the extensive exposure of the dura and the lateral sinus in a suppurating cavity, is worthy of attention; there was absolutely no symptom traceable to the meninges.

I have called attention to these two cases because they occurred together, and serve to illustrate so fully some of the worst forms of aural disease which occur in the course of typhoid fever. They demonstrate the dangers of tympanic suppurations and the difficulties of deciding upon the proper time for operation.

The extreme outward curvature of the sigmoid groove in the specimen shown demonstrates one of the anatomical peculiarities which should always be borne in mind at the operation. As you have seen in the regular lectures, the sigmoid groove usually forms the inner table

of the mastoid process, and is separated from the outer table by from a half to three-quarters of an inch and sometimes more. In this bone it lies directly against the outer table about one-fourth of an inch backward from the spina supra meatum, and formed but a very small part of the extreme posterior portion of the mastoid. The distance between the spina supra meatum and the position of the lateral sinus here was so small that great care would have been necessary in a mastoid operation, and an injury of the sinus could only have been avoided by beginning the operation very close to the posterior edge of the meatus and taking great pains to continue the opening inward parallel with the meatus, as I have so often impressed upon you. As I have frequently told you, the tendency in the operation, as the patient lies upon the table, is to penetrate the bone directly inward, thus unexpectedly wounding the sinus.

ADENOIDS IN THE NASO-PHARYNX.

CLINICAL LECTURE DELIVERED AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL.

BY CHARLES H. KNIGHT, M.D.,

Professor of Diseases of the Throat and Nose, New York Post-Graduate Medical
School; Surgeon to the Throat Department of the Manhattan Eye and
Ear Hospital.

GENTLEMEN,—The condition which we have illustrated in the case before us to-day has been variously denominated hypertrophy of the pharyngeal tonsil, lymphoid hypertrophy in the vault of the pharynx, and adenoid vegetations, of which the last term, or preferably adenoids, is, perhaps, in most common use. It consists of an actual hypertrophy of the lymphoid tissues in the vault, a condition which was first accurately described by Meyer, of Copenhagen, although it had been recognized a few years previously by Czermak. Meyer was the first to resort to operative procedures for its relief. The cause of this morbid condition is frequently hard to find, but it is a notorious fact that it develops often as a sequel of one of the eruptive fevers in children, and it is in a large proportion of cases associated with a general dyscrasia resembling struma in many of its phenomena, which has been described by Potain under the name "lymphatism."

The symptoms of the condition are usually very pronounced, and are thoroughly well exemplified in the case before us. This child, six years of age, the mother tells us, had measles eighteen months ago. You observe that she sits with open mouth and heavy eyes, presenting a very dull expression of countenance; the external nose is rather small and undeveloped; the upper lip is thick and prominent. The mother says that the child never breathes through the nose during the day, that at night the breathing is noisy and labored, and that the child frequently awakes from sleep with a start, as though disturbed by troubled dreams. It is noticed, too, that in responding to our questions the voice has a peculiar quality, having the characteristics of what has been called "the dead voice,"—very much the voice of one

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having a cold in the head. The hearing also is impaired, questions having to be repeated often in a louder tone of voice. We are told, too, that the child has frequently complained of earache, and that she has been more or less disturbed by a hacking cough. She has had frequent attacks of nose-bleed, and we should recognize the fact that epistaxis in children is often dependent upon this condition. The peculiar deformity of the chest-wall, not very pronounced in this case, has been attributed by Dupuytren and others to increased labor in respiration due to the presence of these overgrowths combined with the impediment offered by the enlarged tonsils, but it is probable that the thoracic deformity is due quite as much to the systemic condition associated with the local lesion.

It is seldom difficult to make a diagnosis of adenoids in the naso-pharynx from such appearances as we observe and the history which has been given in this case. If necessary, it is sometimes possible, even in young children, to confirm our suspicion by a rhinoscopic examination, and the picture seen in the mirror is quite unmistakable. Instead of the dome-shaped cavity met with in the normal condition, we perceive hanging from the roof of the naso-pharynx irregular, rounded masses of tissue, which cut off the normal symmetrical arches of the posterior nares. These growths or masses of lymphoid tissue are generally paler than the normal mucous membrane, and are frequently more or less coated with tenacious muco-purulent secretion. The more recent the growth, the more mammillated is its contour and the more vascular its appearance. In growths of longer standing, and in older subjects, the surface is frequently smooth and pale. Sometimes these masses of lymphoid tissue extend down the lateral wall of the pharynx as well as down the posterior wall, so that their lower portion may be seen by inspection through the mouth when the palate is retracted. In some instances a rhinoscopic examination is impracticable owing to the intolerance or nervousness of the patient, or possibly to an abnormal contraction of the faucial space. In such cases it is possible to confirm the diagnosis by a digital exploration. This process is a disagreeable one to the patient, but may be done rapidly, and with safety to the examiner, in this way : The child being seated in the mother's lap, the examiner, standing erect to the left of the patient, places his right hand on the right side of the patient's head, and the child being directed to open the mouth, the cheek is firmly pressed inward between the teeth by means of the middle finger of the right hand. Thus the child cannot close the mouth without biting its cheek. Then the left forefinger is quickly passed into the mouth,

crooked up behind the velum, and rapidly swept over the vault and into the posterior naris on either side, when the characteristic feeling of the diseased vault will be easily recognized, the sensation being conveyed to the finger of a soft, cushiony mass which has been likened to that of "a bunch of worms." This may be an adequate simile in some cases, and, when once perceived, cannot be mistaken for the sensation given by the normal wall of the pharynx. The novice might be misled by the impression given by the contracting muscles of the palate, but it should be remembered that these growths are situated above and behind rather than anteriorly. If any further confirmation is needed in this condition we may resort to the injection of fluid into the nostril or spraying the nostril; when the naso-pharynx is free the fluid or spray will find its exit by the other nostril with equal freedom, which is not the case when the naso-pharynx is occluded by lymphoid hypertrophy.

The prognosis in all these cases is almost invariably favorable, but the only resource is surgical intervention if immediate relief is desired. While it is quite true, as in the case of the palatal tonsils, atrophy of these growths is likely to take place at or soon after puberty, it is likewise true that in a certain proportion of cases shrinkage is long delayed, and in the mean time the patient is exposed to those perils regarding the ears with which we are so familiar. One of the most frequent causes of chronic suppurative otitis in young children is this condition of adenoid hypertrophy in the naso-pharynx. When we appreciate the truth of this fact we shall realize the importance of early operative interference.

As regards treatment, while general medication is certainly insufficient for a cure, it is important that we should not overlook the fact that in most of these cases tonics and good hygiene are valuable adjuvants. The early operative procedures, such as those practised and recommended by Meyer, consisted in an attack upon these growths by means of sharp curettes passed through the anterior nares. With increased familiarity with the condition it became evident that a better means of access to them was by the mouth, and various post-nasal forceps have been devised for the purpose of extracting the growths from behind the velum. The first post-nasal forceps used for this purpose was intended for evulsion rather than excision of the growth; but we find that in attempting to tear away the growth from its site there is danger of stripping up adjacent mucous membrane and doing excessive damage to surrounding parts, so that the cutting edge has been adapted to the post-nasal forceps, and nowadays almost all of

the instruments for the removal of these masses are intended for excision, either by scraping or cutting. In the development of operative procedures in this situation the forceps blades have been gradually increased in size with the object of enabling us to do the operation expeditiously, so that the instrument I now show you, known as the Gradle forceps, has a cutting edge nearly three times as great as that of the forceps used in the early days of this operation. Some forceps, as this one, cut from side to side; others cut antero-posteriorly, as the one devised by Mackenzie, and another with a large blade suggested by Major, of Montreal. A variety of curettes with cutting edges of different shapes and sizes have been proposed at various times; of these perhaps the best is that known as Gottstein's, of which there are several models, some being intended for the roof of the naso-pharynx, and others for the posterior wall. It is hardly necessary to have a great variety of instruments with various angles, for by simply tilting the hand which holds the instrument into various positions we may succeed in adapting the cutting edge of this model of the Gottstein forceps to any portion of the naso-pharynx. One of the best instruments for operating on certain of these cases is one with which we are all provided,—i.e., the forefinger. The forefinger will be found especially useful in young children in whom the growth is of recent development and friable in texture, or in the case of very young children in whom we do not wish to use an anæsthetic. In my own experience I find the Gradle forceps, the Gottstein curette, and the forefinger capable of meeting all possible contingencies. It only remains to speak of the cold-wire snare and the galvano-cautery in the treatment of these cases. There are some operators who express a strong preference for the cold-wire snare, which can be made undoubtedly to serve a good purpose so far as including a large portion of tissue is concerned, but the manipulation of the snare seems to be rather difficult, especially when the patient is not under an anæsthetic or is intolerant. It is pretty safe to say that the galvano-cautery should be reserved for those cases in which we have reason to fear hemorrhage, or in which the use of a cutting instrument is forbidden by the patient. The galvano-cautery should never be employed without the assistance of a self-retaining palate retractor like this which I show you, which is a modification of one suggested by Dr. White, of Richmond. The use of the palate hook is an aid where we are called to operate upon older patients who will give us more or less assistance. The parts having been thoroughly cocainized, the introduction of the hook is easy, and its prolonged retention is not a source of very serious discomfort. It

will be found, however, that in some cases its presence in the fauces causes a good deal of objection, and contraction of the palatal muscles is so violent as to restrict the operative field to a very annoying degree. Of course, all galvano-cautery operations should be done under the guidance of the rhinoscopic mirror. The method of operation to be chosen in my judgment in most instances in children is as follows: The patient is put under the influence of ether, the anæsthesia not being profound. The child is placed flat upon the back with the head rather over the edge of the table, a mouth-gag, of which this one known as Denhard's will be found to be a convenient form, is introduced, and the first step of the operation is to explore the naso-pharynx with the forefinger to determine the extent and distribution of the morbid growth. With the forefinger dragging the velum well forward, the Gradle forceps with blades closed are introduced well up into the naso-pharynx, at the same moment the forefinger being withdrawn. By giving the handle of the instrument a slight rotation we may determine that the blades of the forceps are free in the cavity of the naso-pharynx. The blades are then allowed to open by relaxing the grasp upon the handle, and while still open the shaft of the instrument is forced upward strongly by pressure with the left forefinger. While the pressure is still maintained the blades of the instrument are closed, and whatever lymphoid tissue may be hanging from the vault between them is of course seized in their grasp. Then, the instrument still being firmly closed, by a combined dragging and twisting movement the tissues which have been seized are extracted. The patient is immediately turned on the face to allow the effusing blood to escape. After the bleeding has begun to cease, the child is returned to the position on the back, more ether given, the gag again introduced, and another exploration of the naso-pharynx made to determine whether or not there are any stubs of tissue remaining. If any are found, they are removed with the forefinger, or, if large, they are removed with the forceps. In this way we endeavor to clear out all possible fragments of hypertrophied tissue. In the mean time the anæsthesia should never be so complete as to abolish the reflexes and so endanger the larynx from the entrance of blood and débris. We are protected in a measure against this accident also by the position of the patient, the head hanging over the edge of the table.

The after-treatment of these cases is very simple. The little patient should be put to bed, as a rule, and kept there for two or three days, especially in unfavorable weather. The less handling of the parts by means of applications or douching of any kind the better.

There are certain complications which are possible, but are fortunately not frequent. There have been some half-dozen fatal cases of hemorrhage after the removal of adenoids, but several of them occurred in young children who were allowed to sleep after the operation, and the bleeding continuing, so much blood was swallowed that the child became extremely exsanguinated, and could not be restored. Such an accident impresses upon us the importance of carefully watching these patients, and under no circumstances permitting them to sleep much for several hours after the operation. In case the hemorrhage is alarmingly profuse it may be necessary to resort to measures to stop it. Irrigation of the naso-pharynx with very hot water has been tried with success, and it may be necessary to resort to post-nasal plugging. My own experience with hemorrhage after adenotomy is limited to a single case, in which I finally arrested the bleeding by direct pressure with pledgets of gauze passed in behind the velum, the pressure having to be kept up for nearly half an hour. Another serious sequela is occasionally met with,—namely, inflammation of the middle ear. These cases generally occur in those who have already had ear complication in the shape of chronic otorrhœa, and when we have a history of old ear-trouble we should take special precautions against exposure subsequent to the operation. The treatment of the ear inflammation under such circumstances would of course be carried out on ordinary lines.

In conclusion, I would refer briefly to an unusual case of reflex neurosis which occurred in my experience at the Manhattan Eye and Ear Hospital following the removal of adenoids. We are familiar with certain reflex disturbances which have been attributed by various observers to this condition of lymphoid hypertrophy, such as laryngeal spasm, asthma, etc.; but in my experience the occurrence of torticollis as a sequela of the removal of adenoids is unique. Such a case occurred in the person of a little girl, six years of age, at my clinic at the hospital, the symptoms of wry-neck developing about twenty-four hours after operation and persisting for a period of eight or ten days, or until the operative wound had nearly healed. Such a complication must certainly be very infrequent, and may be possibly due to excessive traumatism, as in the case to which I have referred. The violence exerted at the moment of operation does not appear to have been excessive, but the extent of the traumatism was certainly unusual in consequence of the distribution of the lymphoid hypertrophy, which reached completely to the oro-pharynx over the entire posterior wall of the pharynx and invaded the posterior nares as well, so that the wound-surface must have been unusually extensive.

There are certain causes of failure in the operation which may be referred to. In the very large majority of cases we may safely promise, and shall expect to get absolute, prompt relief to the subjective symptoms. A child who has been hitherto breathing with open mouth at night will on the night following the operation enjoy tranquil sleep, and the breathing previously stridulous and labored will be peaceful and quiet. But we shall find that in a certain proportion of cases the relief is not so marked, and in fact may not be strikingly apparent. There are three possible causes of failure,—viz., the child has got in the habit of breathing through the mouth, and, never having used the nasal respiratory tract, he must be taught to breathe through the nose. For this purpose various devices have been suggested, such as shields to be worn within the lips. The best of all is the method practised by Dr. French, of Brooklyn,—namely, binding up the chin during sleep until the child has formed the habit of keeping the mouth closed. Another cause of failure is the contraction of the pharyngeal space as a result of prolonged disuse, the parts never having undergone normal development. In consequence there is no adequate breathing space. In such cases it will only be after the lapse probably of many months, or years, that the full benefit of the operation will be obtained. The third cause of failure is incomplete removal of the growth, and it is my impression that in a large number of cases in which relapse takes place the recurrence is due to this fact. Undoubtedly recurrence may take place even after a thorough removal, especially when the operation has been performed early in life in children of pronounced lymphatic tendency; but in the majority of cases we are compelled to admit that the relapse is due to incompleteness of the operation. Nasal stenosis is also an important factor in recurrence. The area of mucous membrane behind a nasal obstruction is always in a state of hyperæmia favorable to the formation of new lymphoid tissue.

CHRONIC SUPPURATIVE INFLAMMATION OF THE MIDDLE EAR; SINGLE AND MULTIPLE POLYPI.

BY SETH SCOTT BISHOP, M.D.,

Professor of Otology in the Post-Graduate School; Attending Surgeon to the Illinois Charitable Eye and Ear Infirmary ; Professor of Diseases of the Nose, Throat, and Ear in the Chicago Summer School of Medicine.

GENTLEMEN,—The first two patients present chronic suppurating ears with polypi. We will cleanse and dry the ears and fill them with a fifteen-per-cent. solution of cocaine preparatory to operating. The first one, a man of forty years of age, and a cigar-maker, has not only a long-standing suppuration of the middle ear, but a single, short, and thick mucous polypus, that cannot be secured easily by the snare on account of its short pedicle. The second patient is a machinist's helper, a boy of sixteen, who has a chronic suppuration of both ears and a cauliflower polypus in his left ear. This polypus can be engaged in the snare without much difficulty. It is useless to attempt to cure the suppuration until the polypi are removed and the attachments cauterized to prevent their return. The boy's ears have discharged continuously for twelve years. Last week we gave him two treatments, and to-day we find the powder dry in his right ear, showing that the suppuration has ceased. There is so little boracic acid present that you are able to see one of the three large perforations in the drumhead. This one is posterior to the hammer-handle. The other two, which are filled with the powder, are situated, the one superior to the short process of the mallet in Schrapnell's membrane, the other below the handle. It is quite unusual to find so many openings through the membrane, and in a vast majority of cases there is only one perforation. I cannot better illustrate the treatment we employ for suppuration than to relate our experience with an interesting case that has been discharged cured. The patient was a boy of fourteen years, who induced a suppurative inflammation of his right middle ear by allow-

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ing cold water to enter the ear while swimming. The discharge was neglected for several months until it became copious and foul-smelling. When he presented himself for treatment we found a nipple-like forma-tion of granulation-tissue hanging like an icicle or stalactite from the roof of the external canal, just external to the drumhead. A probe could be passed into a depression in the apex of this nipple, which proved to be the mouth of a sinus leading to the denuded and rough-ened ulcerating bone that formed the top of the meatus. It was hardly to be expected that a cure could be effected without an operation on the bone under general anæsthesia, but a conservative method was adopted according to the following plan : Under a twenty-per-cent. solution of cocaine, the granular cone was removed and the ulcerated bone thor-oughly scraped with my strong ear curette. The ear was syringed with a solution of bichloride of mercury (1 to 5000) as hot as could be borne comfortably. The ear was then inflated through the Eusta-chian tube, with twenty pounds pressure, cottoned out and filled with warm dioxide of hydrogen. After this ceased effervescing, the ear was again dried out with absorbent cotton and gently aspirated with my middle-ear aspirator until no further discharge could be withdrawn.

Bishop's ear aspirator.

Again the ear was dried and filled with a saturated solution of iodo-form in alcohol, which was allowed to remain for five minutes. At first it was necessary to dilute this, but we gradually worked up to the full strength. This penetrates deeply, shrinks up granulations, disinfects, and leaves a coating of crystallized iodoform where powders are not likely to reach. After removing this solution and drying the parts patiently, a coating of aristol was thrown over them with the small powder-blower, and over this was given a thicker layer of boracic acid with the large powder-blower. The finest impalpable powder was used. The ear was then closed with a pledget of absorbent cotton to filter the air and protect the middle ear from dust and winds.

After a few weeks of this treatment the boy was discharged cured. When he first came for treatment he suffered so much from chorea that his sleep was seriously disturbed, and it was difficult to treat him on account of the jerking of the cervical muscles, but we gave him a course of arsenic, and the jerkings subsided and the boy grew fat. This is an outline of the methods we will pursue in the present cases.

We will probably have to modify the treatment to meet varying indications. You may consider it a laborious process. It is. Any work that is thoroughly done is laborious, but nothing short of the most thorough, painstaking, cleanly, and antiseptic methods will cure these decaying ears. Temporizing is unpardonable, for it exhausts and discourages the patients without relieving them of their harassing burdens. The results obtained in these very difficult, long-standing cases are undeniably brilliant, and the ordinary routine treatment of the past is not equal to the task.

On removing the polypi, we find that one polypus proceeded from a perforation in the posterior inferior quadrant of the drumhead, the point which you should always choose for paracentesis, because it is in the line of the column of air propelled through the Eustachian tube. The boy's polypus grew from a perforation in the anterior inferior quadrant. Both being now entirely removed, we will cauterize their points of attachment with a bead of chromic acid fused on this platinum-wire applicator. We will wait for all effusion of blood to cease before cauterizing, for the parts must be free from moisture when the acid is applied, otherwise it will spread over surfaces we do not wish to touch, and cause unnecessary pain and soreness. It is best to give the patient a little of the four-per-cent. cocaine solution to warm and put in his ear on retiring at night, for there is generally pain in the cauterized ear for twenty-four hours following the cauterization. However, if you do not cauterize the point of attachment, another polypus is likely to spring from it.

The patients will be instructed to assist in their cure by syringing their ears with a continuous-flow syringe as often as they are conscious that a discharge is present. They will use each time a quart of pure water, as warm as can be comfortably borne. After the syringing they will fill their ears for ten minutes with a saturated solution of boracic acid in water. You will observe a great improvement in the boy's hearing. When we tested it before treatment there was no hearing for my sixty-inch watch by the ear containing the polypus, and it was heard only one inch from the right ear. Since removing the obstructing polypus the watch can be heard one inch from that ear, and the distance has been increased from one to eighteen inches for the right ear. It is practically demonstrated that we shall be able to restore the usefulness of this boy's ears and perhaps save him from the fatal results of an extension of the disease to more vital parts. But a great mistake has been made in allowing so serious a disease to continue throughout three-fourths of his life, as has been done. The

laity, and, sad to say, even many physicians, do not appreciate the gravity of this malady. Patients often tell me that their family doctors have advised them to let their discharging ears alone, that they will outgrow the trouble. At last these deluded sufferers wake up to find that their troubles are outgrowing them, and an unhappy lot is their portion. This boy owes a debt of gratitude to Dr. Mefford for turning the tide of his fortune by putting him on the highway to health through these clinics.

The use of the ear aspirator shortens the course of treatment by rendering the cleansing process more thorough. We have often demonstrated this fact by cleansing as completely as possible according to the usual methods, and then on the application of the aspirator we have drawn the concealed and retained discharges from the attic and antrum into the external canal in considerable quantities. In certain cases this pus cannot be evacuated without aspirating, especially when it is pent up behind cholesteatomatous masses, or retained in abscess pockets and in the antrum.

The aspirator should not be used with force sufficient to cause actual pain, but traction should be made gently the full length of the piston handle from three to six times. Then the ear should be dried out. Two or three applications of the pump after this manner usually suffice to completely evacuate the middle ear and accessory cavities of pus. If a little effusion of blood occurs, no harm is done. But we can be assured, in this case, that the diseased tissues are stimulated and the more thoroughly swept of discharges. Plenty of time should be devoted to each extraction of the piston, so that the suction shall be moderate and continuous.

The aristol is preferable to any other remedy because of its superior cicatrizant and anæsthetic properties. We cover the thin coating of aristol with a thicker one of the finely-pulverized boracic acid because of the latter's power of drying up pus-secreting surfaces. It is not packed, but placed lightly, and protected by cotton from impure and chilling air.

Dermatology.

THE THYROID GLAND IN THE TREATMENT OF CERTAIN SKIN-AFFECTIONS.

BY ARTHUR T. DAVIES, M.D. (Cantab.), F.R.C.P. (Lond.),

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GENTLEMEN,—I propose to bring before your notice certain cases of skin-affections which I have treated by thyroid feeding. At the outset, I may perhaps explain the *rationale* of this treatment. Seeing the remarkable desquamation which sometimes occurs on the hands and feet, and also the still more remarkable growth of the hair, particularly on the scalp, which takes place in myxoedema after thyroid feeding, Dr. Byrom Bramwell was led to the conclusion that the powerful effects exhibited by the thyroid gland might be of use in the treatment of some skin-affections, such as psoriasis, lupus, eczema, and ichthyosis. He accordingly determined to give the thyroid extract in a well-marked case of psoriasis: the most satisfactory results ensued. Having seen these, I determined to try the remedy, and I now show you the series of cases in which this treatment was resorted to.

The first is that of a man, F. B., aged thirty-two, a blacksmith by trade, who came under my care in February, 1893. He complained of a skin-eruption, which had begun three weeks previously on his left arm, and attacked successively his left leg, right arm, right leg, and trunk. The rash was an ordinary one of psoriasis, the eruption being most marked on the legs. I put him on one tabloid of the thyroid extract (which is equivalent to one-sixteenth of a gland) *per diem*, and immediately there set in a steady improvement. The diseased skin fell off, then ceased to do so, being replaced by permanent healthy tissue, and in eight weeks all signs of the eruption had disappeared. No local application was applied at any time. Before giving the tabloids a simple alkaline tonic was administered for a fortnight, which had no effect on the condition of the skin. This was stopped when the tabloids were

given. Although a year and a half has elapsed since the treatment was stopped, there has been no relapse. It should be remarked that this was the first attack of psoriasis from which the patient had suffered in his life. It is also interesting to note that he volunteered the remark that he felt much more active whilst taking the tabloids.

The second case is T. E., aged sixteen, who came under my care originally for bronchitis. He had well-marked psoriasis of three years' duration, affecting the arms and legs, chiefly on the extensor surfaces, also the trunk. He had taken arsenic internally for some time, and had also used chrysophanic acid ointment externally, which remedies improved him up to a certain point, beyond which he seemed unable to advance. I began giving him one thyroid tabloid *per diem* in April, 1893. There was soon a much more marked and steady improvement, so that I entirely discontinued the arsenic and chrysophanic acid. After taking the tabloids for three months, the patient almost completely lost the eruption. It is interesting to note that in both these cases the diseased condition tended to disappear earlier on the arms than on the legs, and I have observed, in a case of myxœdema in a man who had previously a very hairy condition of the arms and legs, that during the thyroid treatment the hair reappeared much more rapidly on the arms than on the legs. There is a tendency to relapse in this case, but under a renewal of the treatment the disease has again, after six weeks, almost gone, and the boy is now (January, 1895) quite well.

The third case is that of M. S., aged twenty-eight; married. About a fortnight after marriage she noticed an eruption on her legs, which shortly after appeared on her arms. When I saw her in December, 1894, she presented on the back of her neck and on the extensor surfaces of her elbows and knees well-marked patches of ordinary psoriasis: there was no sign of anything specific in the character of the eruption. I put her on one thyroid tabloid a day, under which she has steadily improved. The eruption on the neck was the first to disappear, then that on the elbows, and at the present time—January, 1895—the condition of the knees is improving. The improvement seemed to begin almost directly after the thyroid tabloids were given. There has been a good deal of irritation of the skin, and to relieve this I have, since I was able to be sure that the improvement was due to the thyroid extract, given her an ointment of zinc oleate.

The last case of psoriasis is that of M. J., aged fifty-three, who came with patches of the eruption on her arms, especially the elbows, and on the extensor surface of the knees. I put her on the thyroid extract, two tabloids *per diem*. At first there appeared to be a temporary im-

provement both on the arms and the legs, but, although she continued taking the thyroid extract, the rash reappeared in a more aggravated and extended form, so that I discontinued the use of the remedy and put her on arsenic with a soothing skin-lotion, and in two months she was practically well. She complained of a feeling of weakness, with perspiration and palpitation, while taking the tabloids.

I now pass on to show you a case of congenital ichthyosis treated by thyroid feeding.

M. E., aged forty-three, came under my care for bronchitis. She presented a universal xerodermatous condition, which on the extensor surface of the knees passed into a well-marked ichthyotic state. She states that her mother and her two eldest children are similarly affected. I gave her one thyroid tabloid *per diem,* and within one month a marked improvement in the condition of the nutrition of the skin was visible. At first under the influence of the treatment the desquamation, which had always been excessive, especially on the arms, legs, and trunk, became still more so for a short time, and then ceased. The skin then began to assume a more softened and natural condition, so that she almost entirely lost her xerodermatous state, whilst the ichthyotic condition disappeared. Perspiration for the first time was noticed on the face and head. Although she relapsed slightly under cessation of the treatment, she maintained her improved condition, and quite recently (December, 1894) she has informed me that the condition of her skin is very different from what it used to be in cold weather, and that her face, which used to crack and cause her pain, now feels smooth and natural and comfortable, which, as you can see, is certainly the case.

I now show you a case of lupus vulgaris in a girl of eighteen. When I first saw her, in June, 1894, she presented well-marked patches of lupus in the region of the forehead between the eyes, involving both sides of the upper part of the nose, especially the left, also the lower part of the left cheek, and extensively attacking the neck and under portion of the chin. There were much hyperæmia, tightness, and scabbing. I began by giving her thyroid tabloids, one *per diem,* and within one month distinct improvement was noted, particularly seen in the diminution of the hyperæmia and scabbing and in an increase of cicatrization. Up to the present time (January, 1895) there has been a steady improvement, so that the patches of diseased skin have almost everywhere disappeared and cicatrization has ensued. The treatment caused much general weakness. When, by giving nothing else for three months, I had fully proved that the thyroid extract was producing a beneficial result, I administered in addition a tonic. No local application has

been applied at any time. On two occasions the girl had an attack of hæmoptysis, but I could not detect any pulmonary lesion to account for this symptom.

An important contribution to the treatment of skin-affections by the thyroid feeding is that by Dr. Abraham. His observations relate to ninety cases, comprising psoriasis, lichen planus, urticaria, and lupus. In a minority of the cases of psoriasis he states that he obtained a distinct and curative effect. Byrom Bramwell points out the necessity of exhibiting the drug for at least two months, and also of increasing the amount. In some of his cases which ultimately were cured, the first effects of the remedy appeared to be to increase the eruption, and this I can fully confirm from personal experience and observation. This was very noticeable in the last case I showed you, where the drug seemed to cause a rapid and almost universal extension of the disease, but eventually the psoriasis entirely disappeared. It is interesting to note that this patient was of a neurotic tendency, which, according to Dr. Bramwell, is in some ways antagonistic to the thyroid treatment. It is certainly a remarkable fact that out of six hundred and sixteen psoriatics recorded by Neilson, in the New Sydenham Society's *Transactions*, epilepsy occurred only four times and hysteria only once. It is probable that the fact that the drug tends in some cases to increase the eruption temporarily may account for some of the failures recorded, as it would cause observers to desist from its further administration if they were unaware that this was the effect produced sometimes by the drug at first. In other cases the drug has been discontinued on account of the powerful effects it sometimes produces constitutionally, such as great prostration, a feeling of wretchedness, and a tendency to syncope, and also attacks of violent diarrhœa. As in the case of other remedies of our Pharmacopœia, certain individuals show certain idiosyncrasies to the thyroid extract, and this has been noticed also in myxœdema; for example, in one case of this disease the one one-hundred-and-twenty-eighth part of a thyroid gland caused great discomfort, flushing of the face, elevation of the pulse and temperature, and profuse sweating. In my own experience of the treatment of ten cases of myxœdema, only in one did the dose—one-sixteenth of a gland, which I generally began with—cause any unpleasant effect, and that was a tendency to syncope.

Of these ten cases, to which I have referred above, in two the effect of the thyroid feeding on the hair and skin has been remarkable. In one case, that of a woman aged fifty-three, there were present on the lower part of the abdomen, and involving the flanks, a large number of pigmented papillomata (as you are aware, moles are very common

in myxœdema); there was also almost complete alopecia, so that she was obliged to wear a wig. Under the thyroid feeding the papillomata have very greatly decreased and diminished, and the hair has grown to such an extent on her scalp that she has discarded the use of her wig. In the other case, that of a woman aged sixty, under the influence of the thyroid feeding, her hair, which was of a silvery white, is turning to a golden hue, resembling its color in her younger days. As a consequence of the effect of the remedy on the hair, it has been given in cases of alopecia, with very varying results. Similarly, it has been given in cases of obesity, with like effects.

Although it has been clearly proved that in some cases of skin-affections the thyroid extract can, when given alone, produce satisfactory results, yet, as I have stated elsewhere, I do not in any sense consider it to be a specific in such cases, but regard it only in the light of having a powerful effect in altering the condition of the skin, and in laying, as it were, the foundation for a better and healthier state, and therefore that in cases where this drug is unable alone to effect a satisfactory result, yet it may prove of great value in assisting the action of other remedies. That we are still on the threshold of our knowledge concerning the value and use of this extract in the treatment of skin-affections is quite clear, and, seeing that as yet we do not even know what is the active principle of the thyroid gland, this is scarcely to be wondered at. At any rate, the important function played by the thyroid gland in the bodily metabolism is clearly established from the remarkable results obtained in myxœdema, sporadic cretinism, and in some cases of skin-affection, and the statement made in one text-book of physiology, that the thyroid gland in the human subject may once have been of importance in the economy, but that in the process of evolution it has come to play a subsidiary part, is clearly untenable.

CONDYLOMATA LATA.

CLINICAL LECTURE DELIVERED TO THE SENIOR CLASS OF THE MARION-SIMS
COLLEGE OF MEDICINE, ST. LOUIS.

BY A. H. OHMANN-DUMESNIL, M.D.,

Professor of Dermatology and Syphilology in the Marion-Sims College of Medicine.

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GENTLEMEN,—I desire to present to you two cases of more than passing interest, as they are classical examples, occurring in the male and in the female, of syphilitic lesions which are classed as among the most virulent observed, so far as their power of transmitting syphilis is concerned. You will find that they are, perhaps, not as common as certain other secondary symptoms, simply because they possess certain characteristics which excite the apprehensions of the subject, and are, therefore, submitted to treatment at a comparatively early period. Neglect and a want of proper attention to personal cleanliness are sufficiently prevalent, however, to insure what might be termed a regular crop of these cases, and it is owing to these circumstances that I am enabled to furnish you the present examples.

Condylomata lata have had a number of appellations applied to them, such as flat venereal warts, in contradistinction to the acuminate or ordinary venereal warts, or cauliflower warts,—condylomata acuminata,—mucous patches, moist papules, syphilitic warts, etc. An especial source of confusion is the name venereal warts, which is so indeterminate that, unless details be furnished, we are left completely in the dark as to what is meant by the term. And it is always a matter of importance to know whether the condition spoken of is of syphilitic origin, or due to some other venereal cause. It is important, not only in so far as it concerns the diagnosis of the condition, but from a therapeutic stand-point as well, so that a careful consideration of the diagnostic features will be a matter of some importance to you. In addition to that, the prophylactic value is also of major importance, as it acts not only so far as the direct propagation of the disease is concerned, but also upon its chances of transmission to offspring, or to a

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conjugal partner, and a long train of evils, both physical and moral, are involved. As you are fully aware, it is your duty to prevent such things as much as lies in your power, and, unless armed with the requisite knowledge, you will find yourselves responsible for much evil, which a timely word or well-chosen advice might have averted. But to return to condylomata lata. These lesions occur in the course of secondary syphilis, and are by no means exclusively confined to the external genitalia. You will find them occurring in various localities, such as the perineum, between the toes and fingers, at the commissures of the lips, at the folds of the alæ nasi, at the umbilicus,—in fact, in all those localities in which the skin is thinner than usual and moist; and this factor of moisture seems to be an almost indispensable condition to their origin and growth. You will, furthermore, find that this moisture is an invariable accompaniment of the lesions, and it is for this reason that they have been denominated moist papules, although it is a question as to whether they are ever true papules or not. In my observations of the evolution of condylomata lata, they have always seemed to originate in condylomata as such. This observation has been confirmed by others in their observations of these lesions. However, be this as it may, when fully developed they present characteristics so marked that there should exist no trouble whatever in establishing a diagnosis. I purpose speaking merely of condylomata lata as they occur about the genitalia of the male and of the female, as exemplified in the cases to be shown to you. You will thus have presented graphic representations, as it were, of classical cases, which will serve to impress upon your minds the most salient points in connection with each.

Condylomata lata in the male occur in the form of roundish or ovalish lesions of a pinkish color. (Fig. 1.) The surface is not smooth, but the contours are sharply defined. A constant accompaniment is the moisture, which is due to a more or less mucoid exudation of a highly virulent nature as far as the transmission of the disease is concerned. This liquid is generally sufficient in quantity to involve the cutaneous structures immediately surrounding the condyloma, and thus act as an agent in its enlargement and growth, for these lesions thrive upon moisture. The sites of distribution in the male are upon the inner aspects of the thigh, upon the perineum, and about the anus, as you may see in the case before you. In addition to this, the scrotum is generally the seat of condylomata, although in the present case it seems to have escaped contamination. A peculiarity of the entire process is, that if a portion of the integument be attacked, and another portion comes in contact with it, the latter will in a short time exhibit lesions analogous to the

former. It is this peculiarity which led writers to assume that secondary syphilis was transmissible as such, whereas it is only this form which exhibits this characteristic upon the same individual, and only under the conditions mentioned. For if another individual be infected with the secretion of a condyloma, a chancre and not a condyloma will manifest itself as a result of the infection. This has been so firmly established that there no longer exists any possibility of a doubt in regard to the matter. But to return to the case in hand. The distribution of the lesions has a tendency to be symmetrical. Both sides are affected in a similar manner, and the number is largely governed by the care and cleanliness of the individual. If no precautions be taken, or if neglect of care of the person be permitted, condylomata not only will form rapidly, but will appear in large numbers. A symptom which is invariably an accompaniment of the lesions is a certain disagreeable smell, which is much more apparent to others than to the subject himself. The secretion partly discharges on the underclothing, adding to this odor, besides proving a fruitful source of auto-infection. So far as subjective symptoms are concerned, there are none. The friction of the clothing, or that due to other causes, may excoriate and produce some pain ; but this symptom is not inherent in the lesions. It is for this reason that it frequently occurs that condylomata lata become extensive in their distribution in the male before relief is sought for them. The treatment will be considered in conjunction with that of the eruption in the female when the latter is considered.

In the female we have an entirely different state of affairs, due to the anatomical differences existing in the external conformation of the genitalia. Whilst in the male it is the integument which is mainly implicated, in the female it is that portion which merges insensibly in the mucous membrane, and which shares much in the delicacy and sensibility of the latter,—a condition which is largely explanatory of the peculiarities of the lesions which are observed. As you will note in the patient before you, the distribution is confined almost exclusively to the ano-genital region, and the genital fissure is almost hidden by the condylomata. You can readily see that in extent and in size condylomata lata in the female may assume comparatively enormous dimensions. As in the male, they are rose-color, and the surface is dotted with whitish spots. You will also observe that this adventitious growth extends from the mons veneris downwards and backwards over the perineum and surrounding the anus. (Fig. 2.) In addition to this, the sides of the thighs are encroached upon, and the skin for some distance is affected by the exudation, which is profuse. The
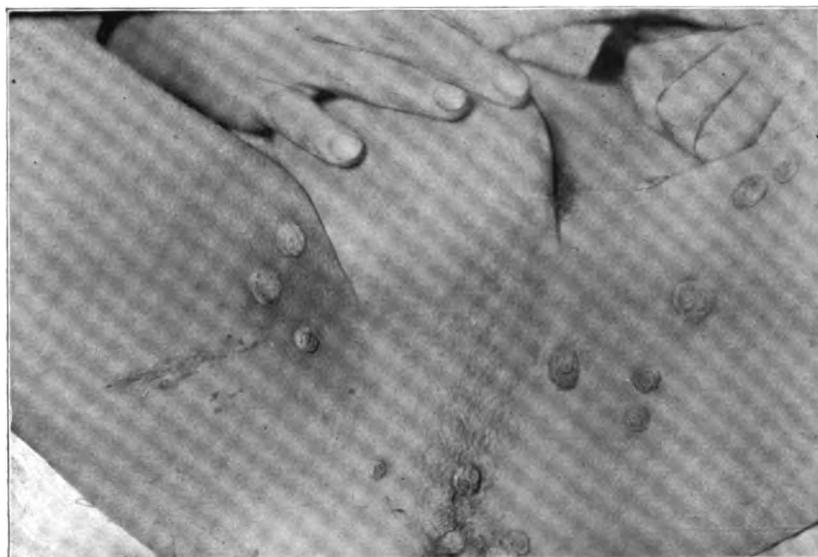
FIG. 1.—Condylomata lata in the male.

FIG. 2.—Condylomata lata in the female.

growth of the entire mass is exceedingly rapid, and becomes alarming to the patient. As you can readily note, the smell proceeding from the lesions is not only strong and penetrating, but it is nauseating as well. If these condylomata be cut or scratched, the bleeding is very free, on account of the large blood-supply and the spongy nature of the lesion. But such hemorrhage need never be alarming, as it subsides spontaneously in a short time. Yet it has no power whatever in stopping the growth, which goes on steadily until very large proportions are attained. When the condylomata are as large as in the case presented to you, there exists but little danger of the woman infecting a man. You can readily understand this from the very nature of things. The smell will excite suspicion, and the sight fill the prospective worshipper at the shrine of Venus with dismay. It is when these lesions are still small and presumably insignificant that they are most dangerous. Little or no attention is paid to them, the woman herself being perhaps ignorant of their presence, and syphilis is transmitted before an inkling of the risk which has been run is even surmised. The woman suddenly discovers her condition, and is very apt to accuse a recent conquest as the cause of the trouble, whose real origin may date back months.

Before speaking of the treatment, it may not be inappropriate to say a few words concerning the concomitant symptoms, which are observed at the time the condylomata manifest themselves. The most common among these are the moist papules, in which the lesions of a papular syphilide lose the epithelium and exude more or less secretion. On the other hand, a distinct papular syphilide or a pustulo-crustaceous or pustular eruption may coexist. It is not uncommon to observe iritis at this time, or mucous plaques of the mouth, rectum, or vagina. In fact, the more common of the secondary lesions are quite apt to be present. On the other hand, cases are observed in which no other lesions are present except the condylomata, and this will be explained when the treatment is taken into consideration. It must not be forgotten that condylomata have more or less a tendency to assume a vegetating character, and are quite prone to relapses,—a characteristic which is so marked that it should insure the closest attention to the proper care necessary in carrying out the minutest details of treatment. This attention, added to proper treatment, will not fail of bringing about a rapid and successful result, both of which are such essential factors in the treatment of all diseases, but more especially of syphilis.

You will remember the particular stress which has been laid upon the necessity of constitutional treatment in syphilis, no matter in what

stage it may be or what its manifestations are. You will always find it a profitable rule to employ energetic internal treatment in all cases of this disease; but you will also find that, in cases like those before you, the best internal measures will fail in causing the disappearance of local symptoms, except under the most trying circumstances to the patients' and your own patience. In other words, the best and most skilfully directed internal measures will prove unsatisfactory unless seconded by proper external aids. There is no doubt whatever in my mind, and experience confirms this opinion, that local measures are of the highest importance in the proper treatment of syphilis in such cases as exhibit local lesions, whether these latter are on the integument or subcutaneous. Moreover, if the lesions are located in parts which are accessible, although not ordinarily visible, the proper local treatment will tend to effect their rapid dispersion and permanent disappearance. I will not point out the general treatment indicated in such cases, as you should be sufficiently acquainted with the general treatment of syphilis in its secondary stage. What I more particularly desire to call your attention to is the local treatment of such cases as those you have seen to-day. They are sufficiently marked to serve as types of the condition, and the particular treatment I will indicate is one which I have found simple, easy of application, and successful,—three conditions which should certainly recommend it to the favorable consideration of every one desirous of obtaining good and rapid results; and the modern school of syphilographers insists strongly upon the combined internal and external treatments.

Various methods and applications have been recommended by different authors in the local treatment of condylomata lata. Among those which are highly favored are cauterizing agents of various strengths. Thus, pure nitric acid applications are resorted to by some, followed by bichloride dressings or by astringent applications. Others prefer solutions of chromic acid of varying strengths, followed by dry or wet applications, or by some form of mercurial ointment. The acid nitrate of mercury in a saturated solution or weaker finds favor among quite a number, whilst the most universally employed is the stick nitrate of silver. That all of these cauterizing agents are efficient none can deny, but that they are also destructive is self-evident. The strength and number of applications necessary to produce the desired result must be such as to almost inevitably entail a certain amount of destruction of the integumentary structure. In order to avoid this milder means have been resorted to, such as drying powders of various sorts, lotions, especially black wash and yellow wash, and ointments.

The results are sometimes good, but more frequently they are not permanent, and relapses occur frequently, thus making the treatment a long and tedious one. My time will not permit me to dwell at length upon these various methods, as I desire to detail one which has proven highly satisfactory to me, on account of the rapid and permanent results it procures, and to patients because it is devoid of pain and is so easy of application. It is very simple, and its mode of action is easily understood. It consists in applying thoroughly to the condylomata the following solution not less than twice daily :

> R Hydrargyri bichloridi, gr. vi ;
> Ammonii muriat., gr. xii ;
> Aquæ destillat., ℥vi. M.

After each application of this solution the still moist condylomata should have calomel applied to them most liberally. It is not sufficient merely to place a small amount of the calomel powder on the lesions, but a goodly quantity is absolutely necessary. Another point which should not be forgotten is that the lesions must be thoroughly cleansed before applying the solution, and for this purpose corrosive-sublimate soap will be found most excellent. After washing with this soap and water and thoroughly rinsing and drying the part, the solution is applied, and then the powder. The fetid odor immediately disappears, there is a sense of comfort experienced, and in a comparatively few days there is no longer a trace apparent of the condylomata. As a patient once expressed it to me, "They disappear like the snow in the heat of the sun." So simple and efficient a method should certainly recommend itself to the consideration of all, more especially as it possesses the advantage of such simplicity that the patient is perfectly competent to carry it out successfully with very little trouble and comparatively no loss of time. In addition to this, the physician in charge is spared much disagreeable work and makes a much better impression.

At first blush it might seem that the results appeared out of proportion to the results claimed, but the efficient action will be easily understood if you but stop to consider that the application of the calomel to the parts still moist with solution of corrosive sublimate has a tendency to produce the formation of nascent bichloride, a most powerful mercurial agent. Whilst it is true that preceding the calomel with a strong solution of common salt will also lead to the formation of nascent bichloride, it must not be forgotten that the corrosive-sublimate solution also acts as an antiseptic and a powerful deodorizer,—

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two qualities of no mean importance in such cases as those we have under consideration. The use of a liberal quantity of calomel is for the purpose of preventing friction of opposing surfaces and consequent irritation of the parts.

One word of caution in conclusion. Do not administer iodide of potassium or other iodine salts internally to your patients during the local treatment advised. The reason of this is that it not infrequently happens that if iodine salts are given and local mercurial applications are used upon the genitals, the latter are apt to develop lesions irritative in character and with a tendency to assume the features of a syphilide. Besides, it is hardly necessary to use any of the iodides during the treatment of the condylomata, and mercurial salts will generally procure better general results in this stage of the disease.

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2

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In offering to the professions of Medicine and Pharmacy the seventeenth edition of the United States Dispensatory, its editors desire to thank most heartily their professional brethren throughout the world for the generous appreciation of their labors,—an appreciation which has been to them a strong incentive for continuous effort. The alterations in the late revision of the United States Pharmacopœia have almost amounted to a revolution, and have necessitated corresponding changes in the Commentary, whilst the extraordinary outcrop of new remedies during the last decade has lent a peculiar freshness and novelty to the seventeenth edition of the United States Dispensatory as contrasted with the one immediately preceding it. The claims made for these new remedies have been so urgent, and the desire for knowledge of them on the part of the profession is so universal, that the greatest care has been exercised by the editors of the Dispensatory to consider them all fully, and especially to point out in the therapeutic paragraphs those minute details in which remedies closely allied to one another differ in their action.

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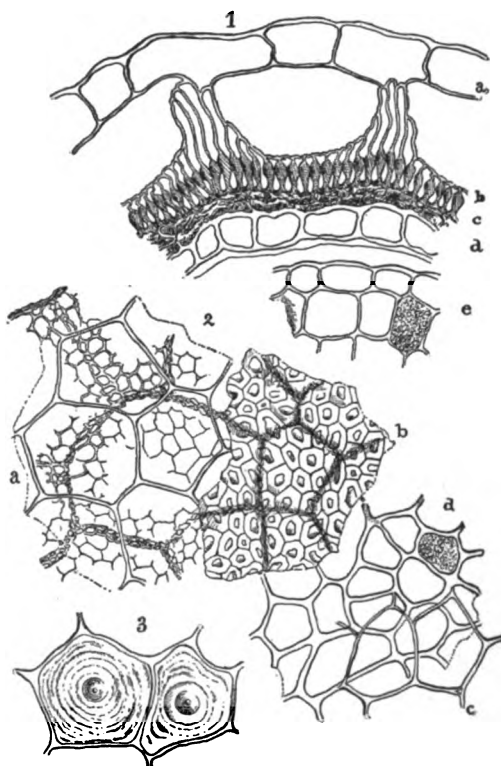
1. Transverse section of the shell of a seed: *a*, epidermal layer with cells empty; *b*, connecting layer; *c*, layer of pigment-cells; *d*, parenchymatous cells; *e*, embryo. 2. Fragment of seed from a surface point of view; parts as in 1. 3. Cells from the epidermal layer, full of mucilage.

names will take a place among those common to every-day life. The whole numbers and rounded forms of the metric quantities must finally secure their exclusive adoption.

The titles of the articles are printed in bolder type, but otherwise the general style of the book has been preserved in the present volume. When a remedy is official in both the United States and British Pharmacopœias under one name, the letters "U.S., Br." follow the Latin title; but when drugs or preparations substantially the same are official under different names, the Br. is put in parentheses—thus, "U.S. (Br.)"—following the Latin title, whilst the British name is given in black letters first among the synonymes.

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TESTIMONIALS.

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4

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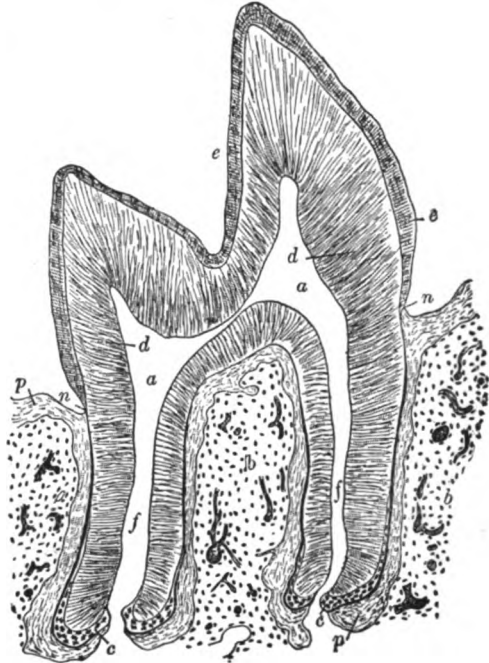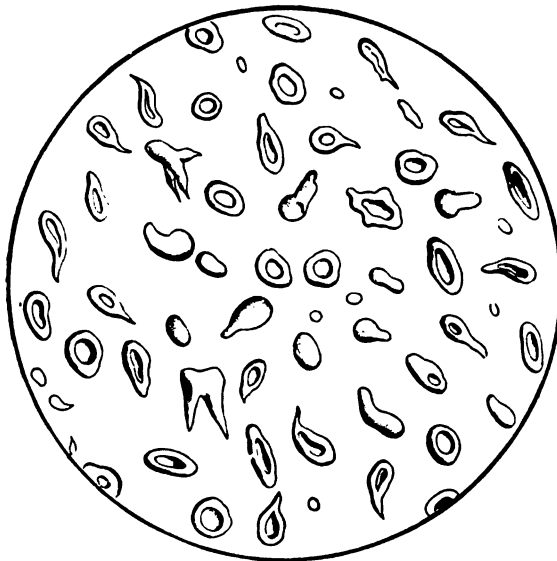
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5

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Blood in pernicious anæmia.
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6

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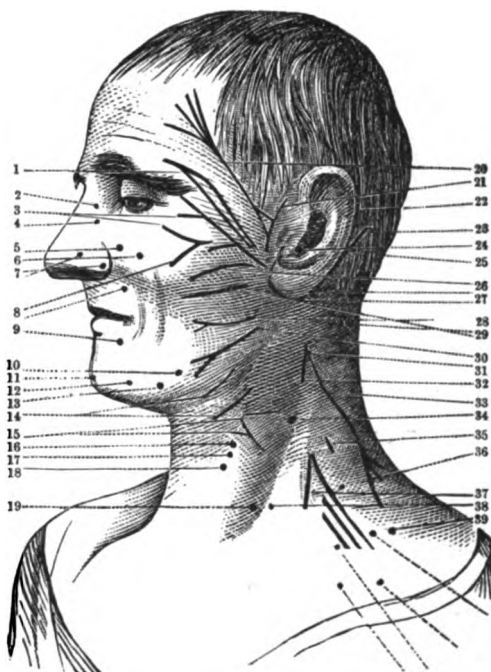
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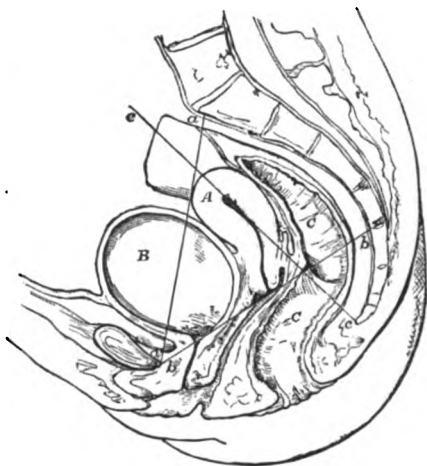
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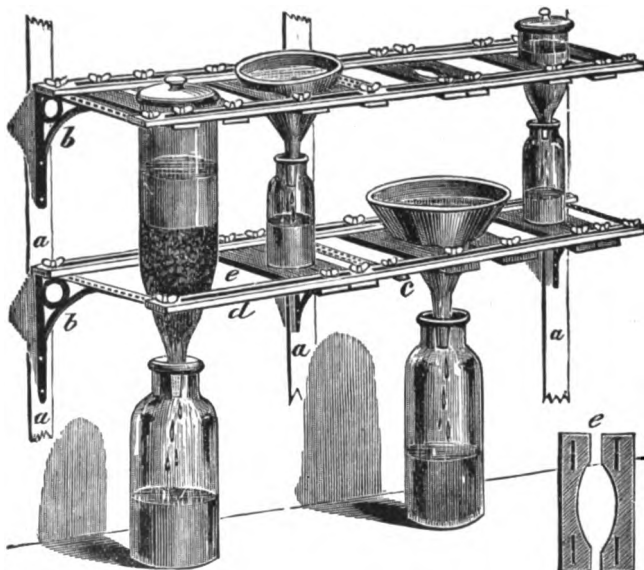
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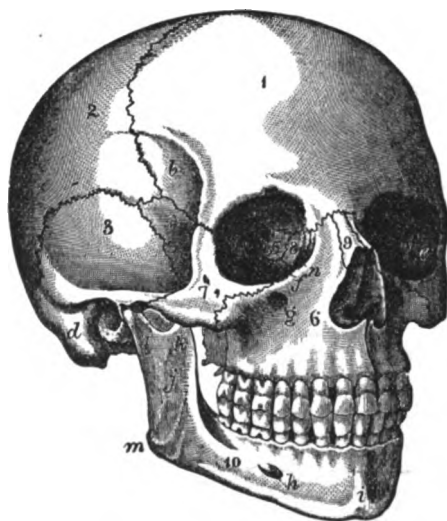" It is not too much to say that ' Remington's Practice' is the greatest and most comprehensive exponent of the science and the art from the time of Paracelsus to the present day."—*Western Druggist, Chicago, Ill.*

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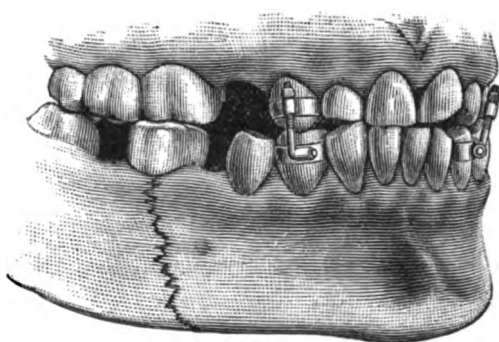
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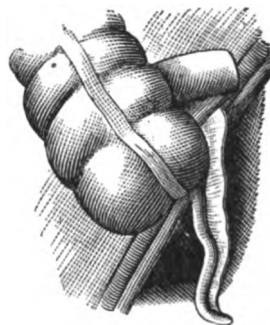
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